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JANUARY, 1960

Vol. XI, No. 5

UNIVERSITY OF ILLINOIS

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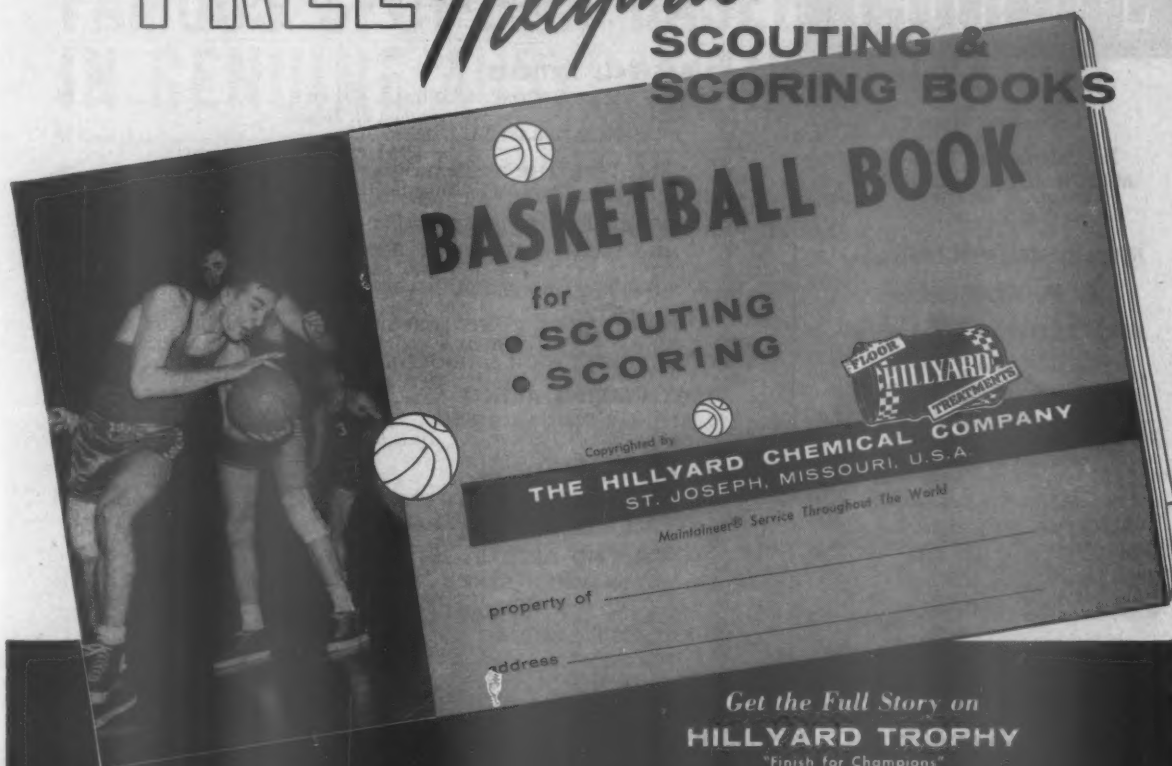


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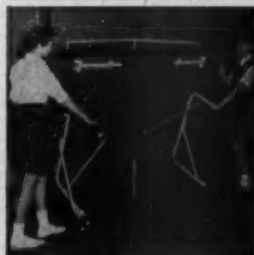
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FRONT COVER ILLUSTRATION

Part of the combination athletic field comprising 40 acres owned by the Tucson school system and used by Tucson High School is shown. Each of the other four Tucson high schools has its own baseball field. Leo Pierce, a very competent grounds keeper, is depicted brushing off the mound and dragging the skinned area with a nail drag, the details for which will be found on page 16.

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Up



HOW about this for an athletic program? New Trier High School in Winnetka, Illinois had over 850 different boys competing in 353 interscholastic contests during the past school year. This figure represents better than four out of every ten boys enrolled in school. Included in the indoor sports program are four basketball teams, four wrestling teams, five swimming teams, three gymnastic teams, and three indoor track teams. Clyde Grater, who was a member of the "Wabash Wonder Five" back in the 1920's, heads up this tremendous athletic program . . . Among the oddities of sport is the fact that while the two Elliotts, ("Bump" and "Pete") are football coaches at Michigan and California, the twins, Bill and Chet Murphy, are tennis coaches at the same two schools. Chet is in his first year at California, having left Minnesota where he was on the staff for a number of years . . . At the start of the current season George Faherty's Adelphi College team played the two hundredth game under his tutorship. Of the 200 games exactly half were home games . . . During a recent high school football game in Kentucky a penalty was called and the referee stepped off 15 yards, signaling backfield in motion. The distraught coach said: "But ref, that's only a 5-yard penalty." "So it is," said the ref,

"but there were three men in motion in your backfield." . . . Gymnastics continue to grow — this year Kansas is sponsoring a state gymnastic meet for the first time, and the Suburban League in the Chicago area will have a round robin schedule as three of the seven member schools that have not had the activity in the past are adopting it for the 1960-61 season.

★ ★ ★

SOME of the proceeds of the Los Angeles Open will be used for a joint program of the Southern California PGA in the L. A. city school system. Under the plan the pros will teach high school physical education instructors so that they may in turn teach golf fundamentals, to group classes . . . The "quote of the month" goes to John Chamberlain of the Newark (N.J.) *Evening News*: "Far from being overemphasized, football may be the schools' most enduring contact with the world of discipline, of sharp thinking, of a demonstrable connection between what one puts into a thing and what one gets out of it at the other end." . . . John Gregory, Georgia end coach, has followed his coaching career into five states. He began at Twin Falls (Idaho) High School, then Copiah-Lincoln (Miss.) Junior

(Continued on page 62)

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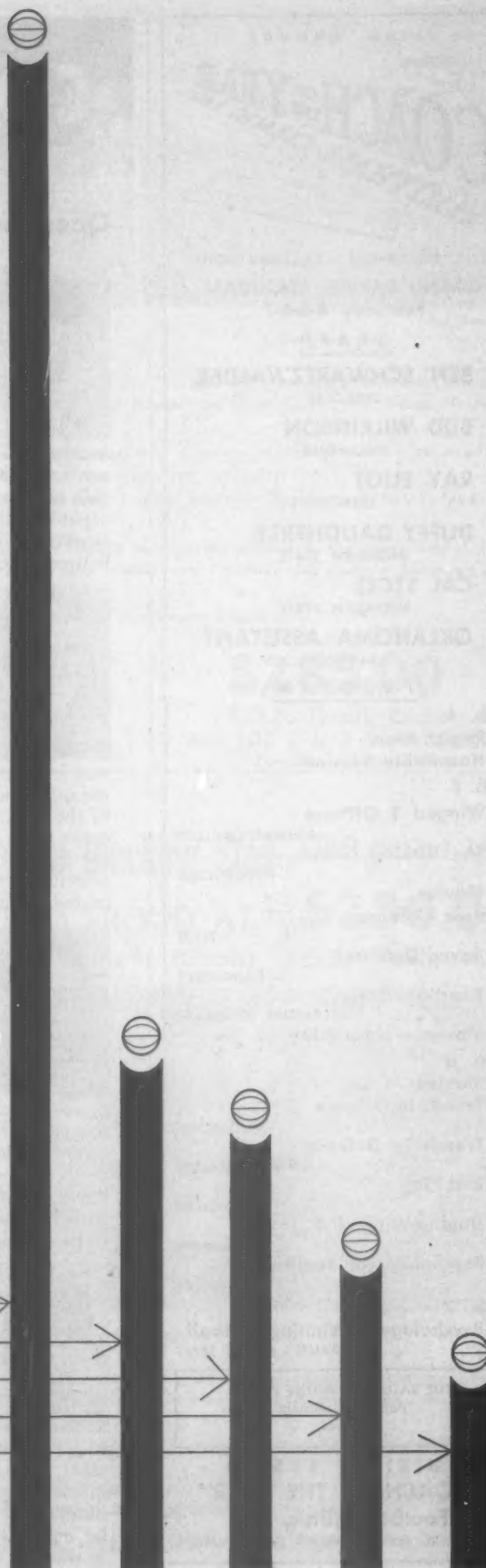
Brand D average 34,660

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(Report #51093 March 25, 1959)

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PROGRAM

- Feb. 4**
Registration
Hospitality Session
- Feb. 5**
Winged T Offense
—SCHWARTZWALDER
The Kicking Game
—WILKINSON
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—ELIOT
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—DAUGHERTY
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—OKLAHOMA ASSISTANT
Movies — Hospitality
- Feb. 6**
Movies
Trends in Offense
—WILKINSON
Trends in Defense
—SCHWARTZWALDER
End Play
—STOLL
Double-Winged T
—DAUGHERTY
Psychology of Football
—ELIOT
- Feb. 7**
Psychology of Winning Football
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COACHES' CLINIC

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On fly balls which can be caught by more than one man, which method or system do you consider best in order to prevent collisions or to prevent the ball from dropping?

WALTER RAAB, University of North Carolina

The system we use to combat this ever-present problem is as follows: 1. On every fly ball hit between two outfielders or between the infield and the outfield, our players are instructed to move instantly into the best fielding position. 2. While moving, judgment is made as to which player can handle the play best. Then as the ball starts its descent, he calls the play by shouting, *I've got it*. The other player answers, *Take it*. Wind direction and the sun must also be considered. 3. The center fielder is given priority in making calls between his position and right or left field. Since he is generally the most capable outfielder he is instructed to make the play when a call is made simultaneously with another fielder. 4. Outfielders are responsible for making calls between their positions and the infield.



FRANK SANCET, University of Arizona

Our method is strict observance of the rule, *The center fielder has the right of way over everyone, and the outfielders have right of way over infielders*. In our opinion, the use of the phrase, *I have it*, etc., is the cause of most of the difficulty. We substitute the name of the position that is to make the play. When fly balls are hit between outfielders, the outfielder who is in the best position to make the catch calls the name of his position, and the other outfielder takes up the chant calling the same thing. Only the name of the position making the catch should be used. The same procedure should occur when an outfielder and an infielder are involved. The outfielder will call the infielder off the play whenever possible. With the center fielder having priority on the play responsibility is established, and the best outfielder is permitted to catch the ball.



DICK SIEBERT, University of Minnesota

On fly balls between the catcher and either the first or third baseman, the first and third basemen have preference. Around the pitcher's mound only the first and third basemen are involved. If neither one calls or both call simultaneously, the catcher should make the decision as to which one is to take it. The second baseman has preference behind first base and the shortstop behind third base. Between the infielder and outfielder, the outfielder has preference. If the center fielder and left fielder are both right-handed, the center fielder has preference. If they are both left-handed, the left fielder has preference. If the center fielder is left-handed and the left fielder is right-handed, the stronger arm has preference. This also applies if the center fielder is right-handed and the left fielder is left-handed. These principles also apply to the center fielder and the right fielder.



RAOUL DEDEAUX, University of Southern California

There is no play more demoralizing in baseball than the *I have it — you take it* routine. Our players are instructed to use four basic fundamentals as follows: 1. The first fielder who is sure of the catch calls for it. 2. The other fielder involved answers as a double check, *Take it, John*. 3. There should be a prearranged signal in the case of a border line ball, or a simultaneous call. It should be understood that the center fielder takes precedence over the right fielder or left fielder, the outfielder over an infielder, the third baseman or first baseman over the catcher, etc. The best handlers of fly balls, physical conditions of play, the sun, and the wind should be kept in mind. 4. In all cases, other members of the team in position to do so wait for a definite call, and then echo the call, *John*.



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2. Into the Ground.



3. Back It Comes.

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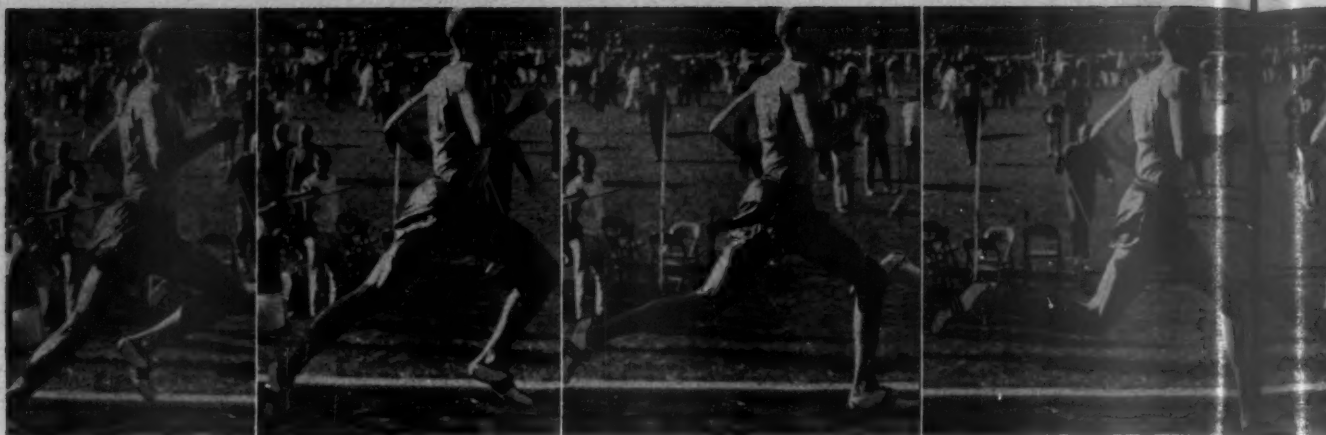
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VOLNEY C. ASHFORD, Dir. of Ath., Missouri Valley College.: "The 7 place ManMaker improved our team which was undefeated and helped us get into the Tangerine Bowl. We are pleased with it, and recommend it to any coach."

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Mile Mechanics and Training Techniques

By **BILL BOWERMAN**
Track Coach, University of Oregon

IT has been said: *A good big man can always beat a good little man.* Most of us prefer and believe more heartily in the axiom: *It is not the size of the dog in the fight, but rather the amount of fight in the dog.* In order to develop a miler, the coach must have a man who has some ability and a great deal of determination.

At the University of Oregon it has been our good fortune to have men of the stature of Ken Reiser, national two mile and steeplechase champion; Bill Dellinger, national mile, two mile, and 5,000 meter champion; Jim Bailey, national mile champion; Jim Grelle, national mile champion; and now Dyrol

Burleson, AAU mile champion at the age of nineteen.

Many of our contemporaries asked us how we developed these men and some asked why. We have also asked ourselves the same questions. In attempting to arrive at some of the answers, it was our good fortune to have a Ph.D. candidate do a four-year study on our middle distance and distance runners. We are indebted to a number of coaches for their generous contributions to this study. A few of these include Holmer, for his Fartlek; Stampft, for his interval method in *On Running*; Igloi, for his indirect contributions through Dale Ranson, at North Caro-

lina; Ceruty, *On Running*; the many outstanding United States coaches with whom we have exchanged ideas — Brutus Hamilton, Hec Edmundson, Flint Hanner, Payton Jordan, Karl Schlade-man, Bob Newland, and Dave Rankin, to name a few.

We feel that Oregon weather contributes to the success of our runners because it is vigorous enough to keep an athlete hustling. Adversity must be overcome in order to achieve success. The Nurmis, Elliots, Bannisters, and other great runners came from a climate similar to that found in Oregon.

The balance of this article will be devoted to a discussion of body mech-





anics and our training schedule. We believe body mechanics should be taught; however, if the athlete achieves better results without them, then they should be abandoned. Regarding a training schedule, it is a guide, similar to a road map, which should help a runner get from point A to point B.

Mechanics

Arm Carry. 1. A distance runner should carry his arms slightly away from his chest because this position raises the chest cage, making for a greater air capacity.

2. His arms should be bent at the elbow between a 45 and 30° angle for two reasons: (a) The shorter the arm swing, the shorter is the corresponding leg swing. We believe a short, quick, light stride is more economical than one which reaches ahead of the center of gravity. The long stride should be used at the end of a race, and the runner's arms should be lowered to a 60 or 45° angle. (b) Circulation is aided by position. Remember, as a youngster how one could keep water in a bucket by swinging the bucket in an arm's length circle?

JIM GRELLE, NCAA Champion

1. The illustration shows excellent arm carry at slightly less than 90°. Grelle's leg action is efficient and not exaggerated. 2. Good powerful thrust with the right leg and foot is shown here: His left leg is not overreaching. 3. Notice that Grelle's arms are in an economical, efficient position and he is in a relaxed stride position. 4. His left foot is coming down for a "flat" landing and his arm is slightly across his chest. 5. Again the arm is at slightly less than a 90° angle. 6. This illustration shows an excellent "flat" left foot under the center of gravity. Grelle's right leg is relaxed in the recovery. 7. He is ready to "jump" the opponent and go into a sprint. 8. It will be noticed here that his left arm is leading his right leg in an efficient, economical stride. This illustration also shows the beginning of the left leg thrust. 9. The economical arm carry and swing are noticeable here.

DYROL BURLESON, AAU Champion

1. Illustration 1 shows the angle of Burleson's arm is less than 90°. He is breathing through his mouth. 2. In this illustration, Burleson has brought his left arm across his chest a bit too much, causing his right arm to swing wide. 3. Notice in Illustration 3 that his right foot is coming down for a good heel-to-ball landing. 4. Burleson's easy leg action is shown here as his heel-to-ball landing is almost directly under the center of gravity. 5. Illustration 5 shows Burleson passing over his slightly bent right leg. 6. In this illustration we see the complete relaxation of Burleson's left (recovery) leg. 7. Compare the better position of his right arm with that of his left arm as shown in Illustration 2, thus making for better "straight-ahead" action. 8. Notice the excellent position of Burleson's right arm. 9. The right leg thrust is efficient and powerful. 10. Burleson is in a relaxed position as he begins the next stride.



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The blood also reacts to centrifugal force. Circulation is aided by maintaining less swing in the arms.

Breathing. Some runners naturally breathe rhythmically and easily. We will not dwell on oxygen debt other than to say we believe a better balance is maintained by deep rhythmical breathing. A runner should beware of labored, panting breathing.

Some work is done on two, three or four step rhythm. Our runners walk and count breathe in one, two; out one, two; and then try the three and four count rhythm. Most of them have found the most effective rhythm to be the three count.

We believe a runner's mouth should be slightly open and most of his breathing should be done through his mouth.

Foot Landing. We believe it was Armas Valste, the Finnish coach, who said: *European sprinters sprint like runners; American runners run like sprinters.* At that time the American runners were running distances of 1500 meters and longer on the balls of their feet.

Our runners are told to experiment with the flat-foot landing, the heel-to-ball landing, and the ball-to-heel land-

Bill Bowerman graduated from Oregon in 1935 where he participated in both football and track. He coached for one year at Franklin High in Portland and then began nine very successful years at Medford where his teams won three state championships and his football teams a like number. He also had three undefeated seasons at Medford. Returning to his alma mater in 1948, Bowerman's record has been outstanding because in four of the last seven years his teams finished among the first ten in NCAA competition. He has produced eight individual NCAA champions.

ing. Eventually, they will use the type or types of landings that best suit their needs. We have had outstanding runners use each of these foot techniques. Ken Reiser had a very efficient flat landing. Jim Bailey used the ball-to-heel landing, and Bill Dellinger uses a heel-to-ball landing most of the time.

Training Schedule

A good banker, lawyer or doctor is constantly practicing his profession. How can a runner become proficient if he devotes only March, April, and May to his development?

We prepare a master schedule which starts in October and extends through June. Let us assume that Burleson and Grelle want to run the mile in four minutes in June. We prepare a master schedule which shows 75-second quarters in October; November 72s; Decem-

(Continued on page 63)

Spanjian
 PASADENA



Long Horse Vaulting

By **DICK HOLZAEFFEL**
Gymnastics Coach, State University of Iowa

RUNNING, vaulting, and climbing have been the backbone, so to speak, of the gymnastics program since the activity known as gymnastics began. The side horse (which is the long horse when pommels are mounted) and the long horse stem from the days of King Arthur. At that time the apparatus were used to train and strengthen the fledgling warrior in preparation for the future responsibility of horsemanship.

At the present time long horse vaulting is used as one of the required Olympic events and is found in interscholastic competition.

A performer is judged on his running

technique which should be smoothly accelerated and graceful.

The take-off should be executed with both feet and the amount of backward lean should be in proportion to the forward momentum. The performer's arms should be swung forward and upward, timing the take-off with the hip and knee extension. His hips and legs rise well above the height of his head when his body is in flight. An angle of 45 degrees from the head of the horse to the performer's feet is to be encouraged and desired. Both the run and the

take-off are shown in Series A.

Series A — The Stoop Vault From the Neck.

Description: The action is performed from the neck of the horse. A performer should be in a jackknifed position when passing over the neck of the horse.

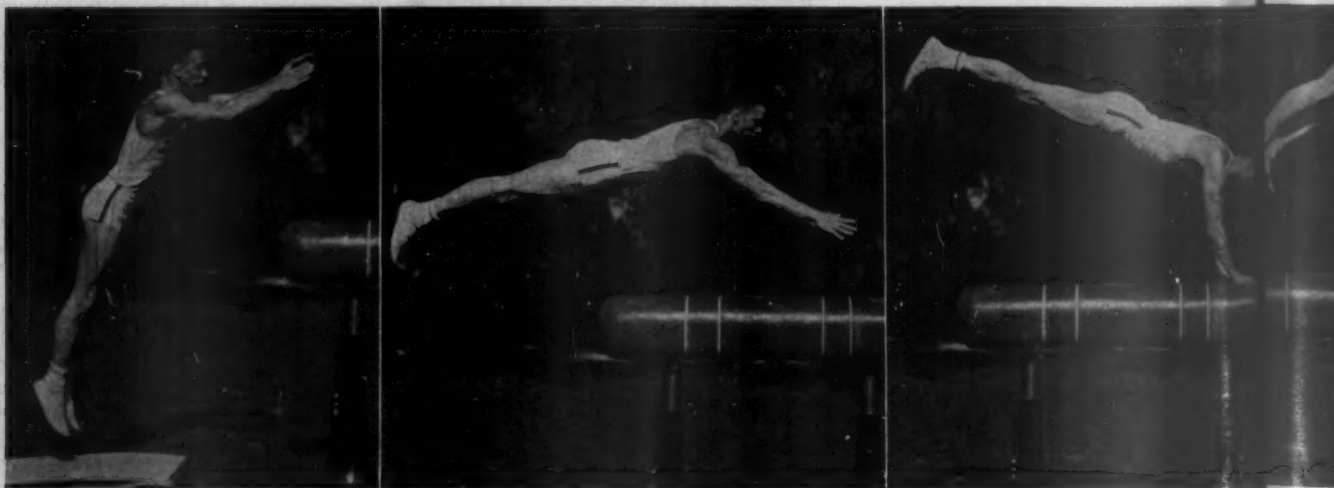
Execution: 1. From the extended position achieved on the take-off, hip flexion is performed.

2. A performer's weight should be momentarily on his hands.

3. As full hip flexion is achieved, the shoulders, arms, and hands thrust the body weight from the horse. This upward thrust is aided by the rapid hip



Series A



flexion.

4. Flexion is released after the performer passes the neck of the horse.

5. Launching preparation is made with body extension, and the performer's arms should be raised for balance.

6. His knees should be flexed to help absorb the shock.

Teaching Methods: 1. Learn squat vaults to the croup, saddle, and the neck of the horse and then over the horse.

2. Learn the stooping action to the various parts of the horse.

3. Learn to stand on the croup and dive to a stoop vault.

4. Practice the total vault with the horse at medium height.

5. Practice the vault with the horse at competitive height (48-51 inches). The performer's legs should be slightly apart.

6. Execute the complete vault with a spotter nearby.

Series B — The Bent Knee Stoop Vault From the Croup.

Description: In this vault the performer's knees and body should be flexed immediately upon take-off. Then, as the neck of the horse is passed, his knees and body should be straightened.

Execution: 1. The performer should place his hands immediately upon the croup of the horse after take-off. Notice the distance of the spring take-off board.

2. His hips should rise and his knees and trunk should be flexed and drawn under.

3. The performer's eyes should be on the neck of the horse.

4. His arms should push upward and forward to further propel his body in its flight.

5. Knee straightening should start about halfway along the horse in order to achieve the stoop-vault position before passing the neck of the horse.

6. Landing preparation should be assumed while the performer is attempt-

Dick Holzapfel, head gymnastics coach at the University of Iowa since 1947, has written 11 illustrated articles for us on his sport. Among them are "Elementary and Advanced Rebound Tumbling Stunts," "Handsprings and Headsprings," "Somersaults — Gainers and Routines," "Tumbling — A Comparison and Analysis," "Tumbling Stunts and Combinations," "Popular Stunts on the Side Horse," and "Selected Stunts on the Horizontal Bar." Over 550 sequence photos have been used to illustrate these articles.

ing to hold the position without moving a step forward.

Teaching Methods: 1. Practice the mount to the croup, saddle, and neck.

2. Practice the squat vault from the neck, saddle, and then the croup.

3. During the practice on No. 2 have two spotters stand alongside and lift the performer through the various stages by grasping him by the arms during his flight.

Series C — The Cartwheel.

Description: The vault is executed in the handstand position with one hand on the saddle and one hand on the neck of the horse.

Execution: 1. After the run or approach, the arms should drive upward, the chest should move upward and forward, and the performer's hips should be thrust upward and flexed simultaneously. These movements develop the angular or rotary action necessary.

2. The performer's left hand should lead and with the lowered shoulder should start the twisting or cartwheel action.

3. His head should turn and his eyes should look at the last hand placed on the horse — the saddle area.

4. Body extension should follow with the back arched, legs straight, arms locked, and head up.

5. The performer's weight should

shift from his left to his right arm as the stunt progresses.

6. On the descent he should thrust with his right arm and prepare for landing.

7. His legs should be kept together until the moment of landing.

8. The performer's arms should be out to maintain balance, and his legs should flex to absorb the shock.

Teaching Methods: 1. Learn the cartwheel on the floor.

2. Learn the cartwheel from the horse to the floor.

3. Learn the cartwheel to the horse and over with a springboard and small rebound tumbling apparatus. This method allows the mechanics and form to be practiced in safety.

4. Lower the horse for a bona fide attempt.

5. Gradually raise the horse to competitive level and use spotters.

Series D — The One-Half Twisting Straddle Vault.

Description: This vault is performed with a forward take-off and one-half twist. The performer's legs are scissored, he reverses his position, and faces the horse on landing.

Execution: 1. The take-off should be performed with the performer's arms raised, the forward leg thrust, hip lift, and body elongation following the semi-flexion of the trunk.

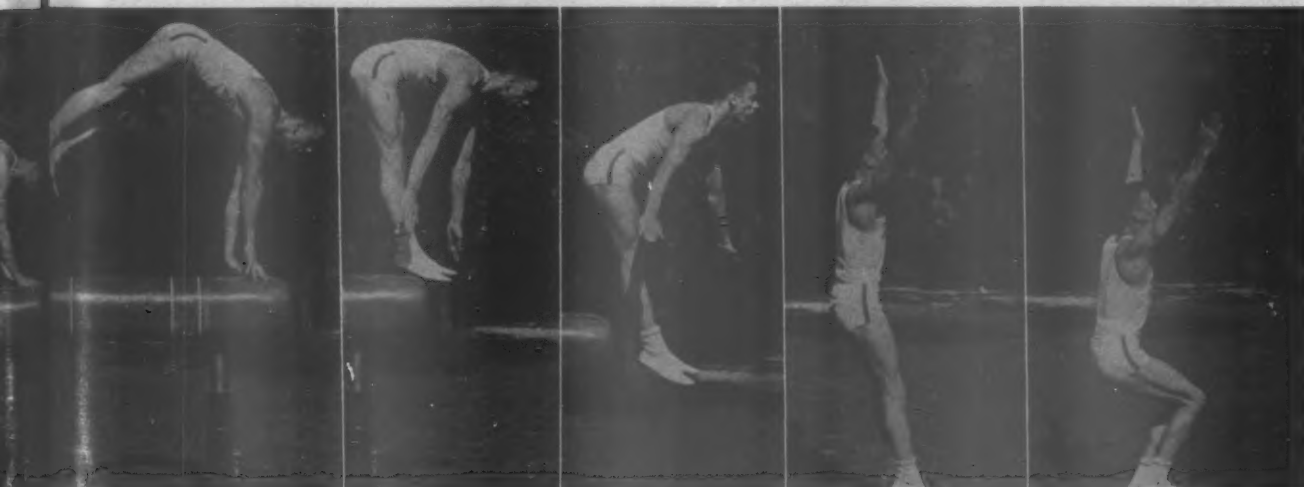
2. His hands should contact the neck of the horse.

3. His right leg should be crossed under his left leg and his left arm should be thrown to the rear after the thrust from the horse thus executing the twist.

4. A performer's hips should be flexed to move the center of balance over support.

5. He should face the horse, his arms should be raised, and his knees should be bent for the landing.

Teaching Methods: 1. Practice the



back-straddle vaults over a buck.

2. Practice back-straddle vaults on to the horse.

3. Stand on the horse and execute the vault procedure as a dismount.

4. Perform a low back-straddle vault and have two spotters lift the vaulter over the neck of the horse.

5. Perform the total vault with spotters.

Series E — The Front Handspring.

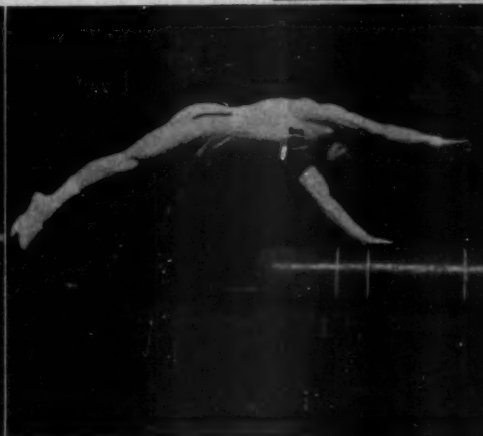
Description: The performer executes a front handspring from the neck of the horse.

Execution: 1. The take-off should be the one which has been described pre-

Series B



Series C



viously.

2. A hip extension should be executed; the performer's hands should find support from the neck of the horse.

3. Angular rotation should be achieved by maintaining support on the horse and having the center of rotation confined at that point.

4. The performer's head should be up for three-quarters of the arc, and his arms should be straight.

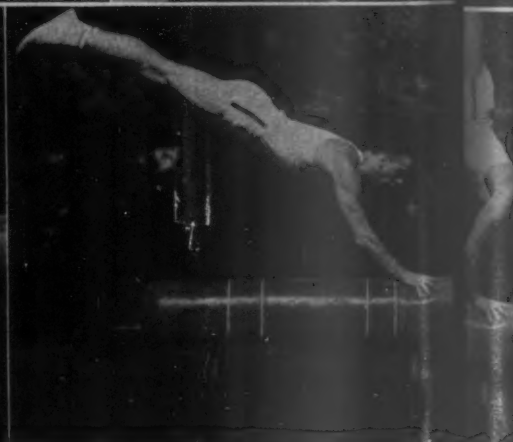
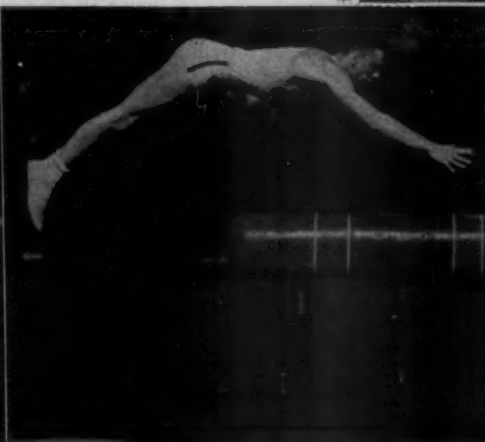
5. His head should be lowered as the final portion of the stunt is executed.

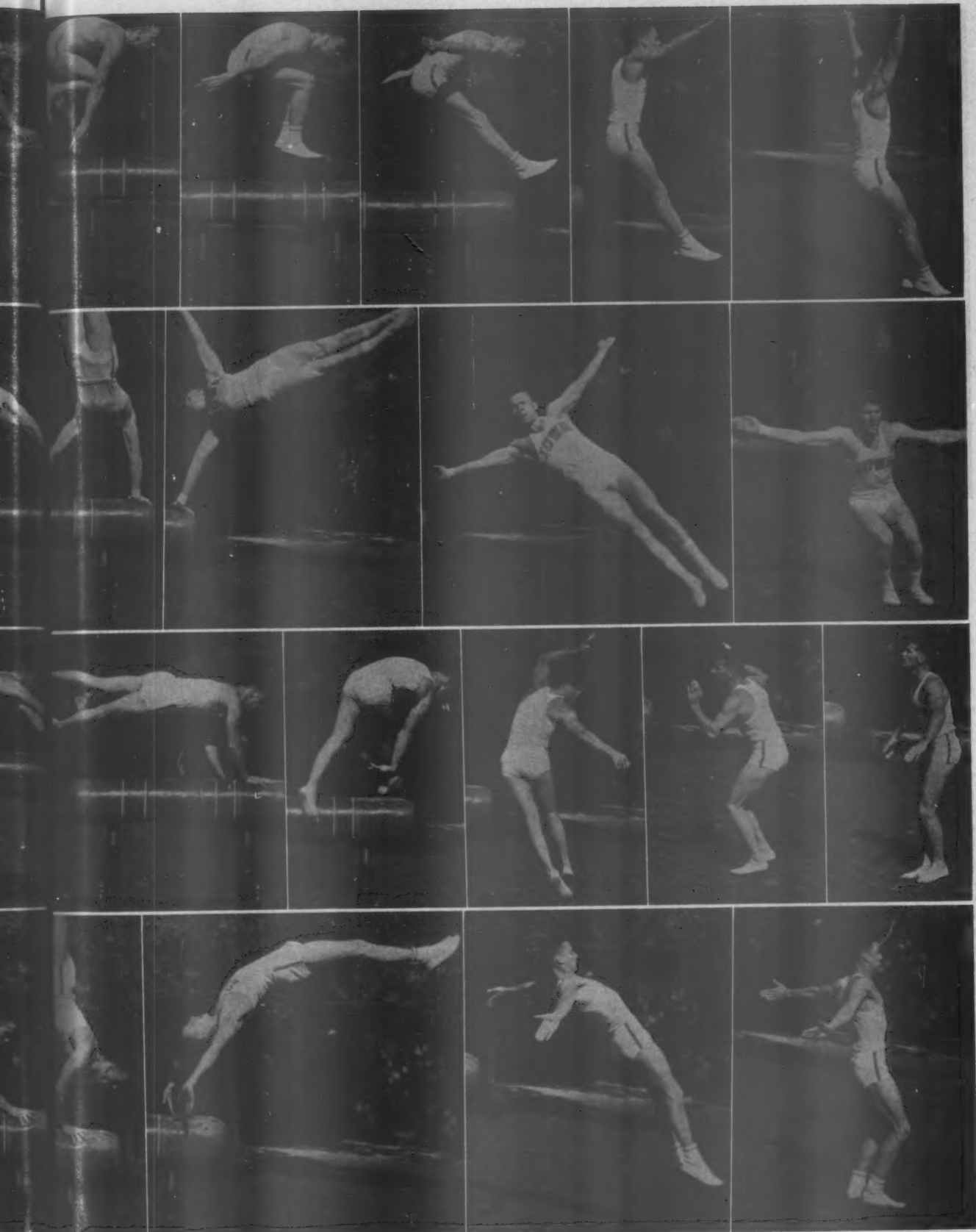
(Continued on page 57)

Series D



Series E





Maintaining the Baseball Diamond

By LEE M. CAREY, Baseball Coach, Rincon High School, Tucson, Ariz.



Last month we presented a detailed article entitled "Constructing the Baseball Diamond" by Clark V. Whited. The following article will concern itself largely with the problems of maintenance for the existing field.

Most baseball coaches at the high school and college levels are aware of the importance of having a well-planned, well-kept field for their players to play and practice on. In order to develop the self-confidence in a player that is vital to success in the game, it is necessary to have a field that has firm but spongy turf on which the ball will take true hops, a pitcher's box built and shaped to hold up under the pounding a pitcher gives it, a batter's and catcher's area with firm footing for hitters without the presence of deep holes, and last but not least, well-constructed base paths to allow for the maximum speed of runners without leaving large divots where the spikes twist and turn. Naturally, there are other areas which must be constructed and maintained, but they can be worked out, depending upon the coach's requirements, space available, kind of turf, maintenance crew, and finances. Climate should also be considered in the care and construction of the field.

Here in the Southwest we are quite proud of our high school baseball programs. The playing season is helped by excellent weather and our fields are maintained well to insure the maximum according to the player's ability. Arizona schools are limited to twenty games

per season in order not to interfere too much with a player's academic work, but the teams practice and play from late January until the middle of May. With this long season we can teach a considerable amount of baseball, and the players thoroughly enjoy working on a field that gives them a sense of pride in all they accomplish. It is our feeling that nothing is more damaging to the development of baseball players than to have them attempt to learn the game on a poor field with poor equipment.

Let us assume that the field has been planned and surveyed to specifications. We will not discuss this part in detail except to mention that it is important to have the playing area oriented to the rays of the sun with maximum protection for the catcher, pitcher, and batter. This protection is achieved by having a diamond with home plate to first base

running from west to east, or one with home plate to first base running from north to south.

The grassed area on a baseball field can add to its attractiveness, slow down ground balls so they can be fielded with a reasonable amount of skill, and serve as a cushion for the player's feet. It is worthwhile to provide a field with underground drainage, but most areas will have ample drainage and drying qualities with grass as the water absorber. Base paths can be constructed similar to a turtle's back, and the skinned areas should have a slight slope to the outfield. Home plate should be placed several inches higher than the grass line surrounding the batter's area to provide for drainage from rain and ordinary watering of the field.

The preparation of these areas is not as difficult as most grounds keepers and

(Continued on page 64)

This illustration shows the cut-out and partial dragging of the field as seen from the first base side. Notice the cut-out of the third base area. The field is shaped somewhat like a kidney bean which helps keep dirt and sand from being pushed onto the grass when runners slide into third.



This illustration shows a view of the mound. Dirt or clay that will pack and stay packed without becoming gummy from water is preferred. Most high schools and colleges cannot afford tarpaulins to cover mounds or similar areas. The dirt must be tight, but not gummy.



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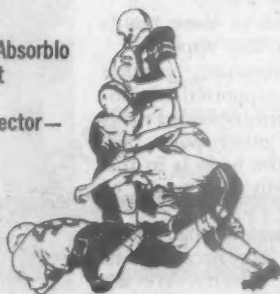


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Illustration 2



Illustration 1



Illustration 3



Illus. 4

The Swimming Start

By FRED HEFFNER

Swimming Coach, San Marino, California, High School

THE freestyle start is probably one of the most controversial maneuvers with which swimming coaches are forced to contend. We must remember that there are two schools of thought concerning the diving start. One group believes that races are won and lost in the water. They feel that time spent practicing a start is not worth the tenth of a second or so saved because it may be neutralized by conditioning. In other words, they think it is better to spend an extra half hour on conditioning than on a start. If the swimmer has a slow start, it will be offset by increased vigor from the added conditioning according to their thinking.

The other school maintains that the first swimmer out from the starting block the farthest, and in the water the soonest has a decided advantage throughout the entire race. Therefore, they feel that a reasonable percentage of the workout should be spent on the start.

We do not intend to minimize or overemphasize the swimming start. What we will attempt to do is point out a few items concerning the start

which are common knowledge and then recommend a technique for execution.

There seems to be general agreement on the following:

1. The function of the start is to enable a stationary body to become a moving body with a high degree of velocity.
2. A stationary body must react quickly to become a moving body.
3. The path of flight must position the body for proper entrance into the water.
4. A body must enter the water in a position which will reduce drag from the water to a minimum.

We will discuss each of these points in the order in which they appear.

In competitive swimming, coaches must consider that a supported stationary body becomes an unsuspended moving body. Few, if any other sports, face this problem. When the body is in this stationary position, only two points of contact are evident.

It is reasonable to assume that strong and/or flexible legs are necessary in initiating the body's velocity. We as-

sociate muscular effort with the accelerated motion of objects. For example, in order for a ball to be moving at a high rate of speed, the muscular effort behind it must be increased. Thus a body will move just as fast as the force behind it will allow. This statement is proved by a law of physics that the magnitude of the force which acts upon a mass is the product of the mass and its acceleration. It is apparent that a swimmer must get as much force from his legs as possible in order to push his body through the air swiftly. There are a number of exercises which may be used to condition the legs and to provide and maintain the needed force. An exercise we recommend is to have the athlete assume a squatting position, jump as high as he can, and then unfold his legs and reach with his arms. Fifteen repetitions each day during the season will help to condition a swimmer's legs.

The position which provides a quick reaction for the body's movement is open to argument. We believe that the more relaxed a swimmer is when he is in a starting position, the less likely he is to tie up at the initial phase of

(Continued on page 60)

Illustration 5



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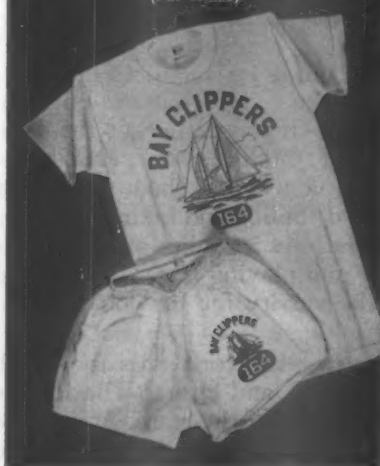
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ATHLETIC JOURNAL

America's First Coaching Magazine

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Credit Where Credit Is Due

RECENTLY we received a copy of an address given by Mr. C. L. Jordan, vice president of the Franklin Institute and a trustee of the National Pop Warner Conference.

We were surprised to learn that Benjamin Franklin, in addition to his many other contributions, was in fact the "father" of physical education in our school system. During his stay in England his prowess as a swimmer became so well known that some of the English nobility urged him to remain and teach their sons to swim.

When Benjamin Franklin returned to America, he wrote the first recommendations for organized sports and physical education in the proposals for the Academy in Philadelphia which is now the University of Pennsylvania.

Lettered in gold leaf in Weightman Hall (University of Pennsylvania — athletic department headquarters) appears the following quotation authored by Benjamin Franklin in 1749.

"That to keep them in health and to strengthen and render active their bodies they be frequently exercised in running, leaping, wrestling, and swimming."

The Benchwarmer

LAST spring Jim Allen, the basketball coach at Newark, Ohio, High School, sent us a short paper which had been written by one of his players. Shortly after the conclusion of the last basketball

season Dick Woolard, now a freshman at Muskingum College, expressed in writing what we consider to be a fine presentation of "the case for the substitute."

Among other things, Woolard said: "The benchwarmer is the man who warms up before a game, joins the opening huddle, and then quietly goes to the seclusion of the bench. People fail to realize or appreciate the effort this man must put out to earn the right to 'ride the bench.'"

"The only time a benchwarmer sits down is during a game. In practice he is the equal of any of the starting five. Why is this? For the unknown reason that he is the person who makes the team. He inadvertently wins the ball games the first string is praised for winning. On Monday of each week, following the game of last Friday, he is assigned the name of a player on the next opponent's team. The coach tells him in detail the favorite shots, moves, and passes of the opponent. He also learns the part his opponent will play in the function of the opposing team's offense. Then for four days, one hour and forty minutes per day, he will impersonate the enemy against the defense the varsity will use in the coming game. The reserve will work wholeheartedly at his job until the varsity player reacts instinctively to his moves and will be able to do so in a game. Daring interceptions in a game may be the result of knowing what the opponent will do from practice. Impersonation of the opponent is only part of the reserve's participation in practice. The reserve will also shoot with a varsity player, practice dribbling and faking with him, and help him correct any mistakes or changes he sees in his shooting and playing form. In this manner he prepares the varsity for the job ahead of them.

"What reward and satisfaction does the benchwarmer get for his work and effort? The first reward he gets is being part of the team. Any reserve gets satisfaction through knowing that he is one of a small group in a big school, good enough to make the varsity basketball team. He is content to work hard in practice, help the team, and wait for his chance to show his particular talents. The second reward a reserve gets is the privilege of associating and being closely united with the fellow members of his team. Any former basketball player knows nothing can equal the fun of going on a road trip with his teammates. The biggest reward a reserve gets is the knowledge that he is dearly appreciated by his coach.

"The sports of today have gone 'big time.' They have reached the point where winning is more important than anything else. This movement hides the importance of the reserve. But the public must not forget him since he is as important as any member of the starting five."



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Vitamin B ₆	16.0%	16.0%	16.0%	18.0%
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NOTE: These percentage values are slightly higher for girls and women.

Teaching Lacrosse Fundamentals With a Football Blocking Device

By **GEORGE C. AKERSTROM**

Director of Athletics, Kimball Union Academy, Meriden, New Hampshire



Illustration 1

Illustration 2

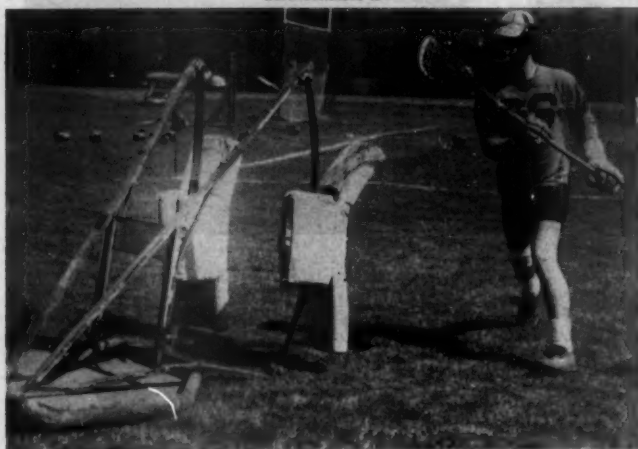


Illustration 3



WE use a football blocking device to develop the basic lacrosse fundamentals of dodging, blocking, holding off, two-on-one, and picking up the ball.

Three dodges are stressed—face, dip, and circle. In indicating the direction of movement of a player, we shall refer to low-hand side or high-hand side. Low-hand side for a right-handed player will be his left side, and for a left-handed player his right side. High-hand side for a right shot will be his right side, and for the left shot, his left side.

In the face dodge, the player approaches the blocking device with his low hand to the inside, a stick's length from the pad. He brings the stick, held vertically, across his face to the low-hand side (Illustration 1), and then back quickly to the high-hand side, stepping by the pad, and keeping the stick protected by his body. At first the face dodge is executed in slow motion and then, after the technique is learned, it is speeded up. The ultimate

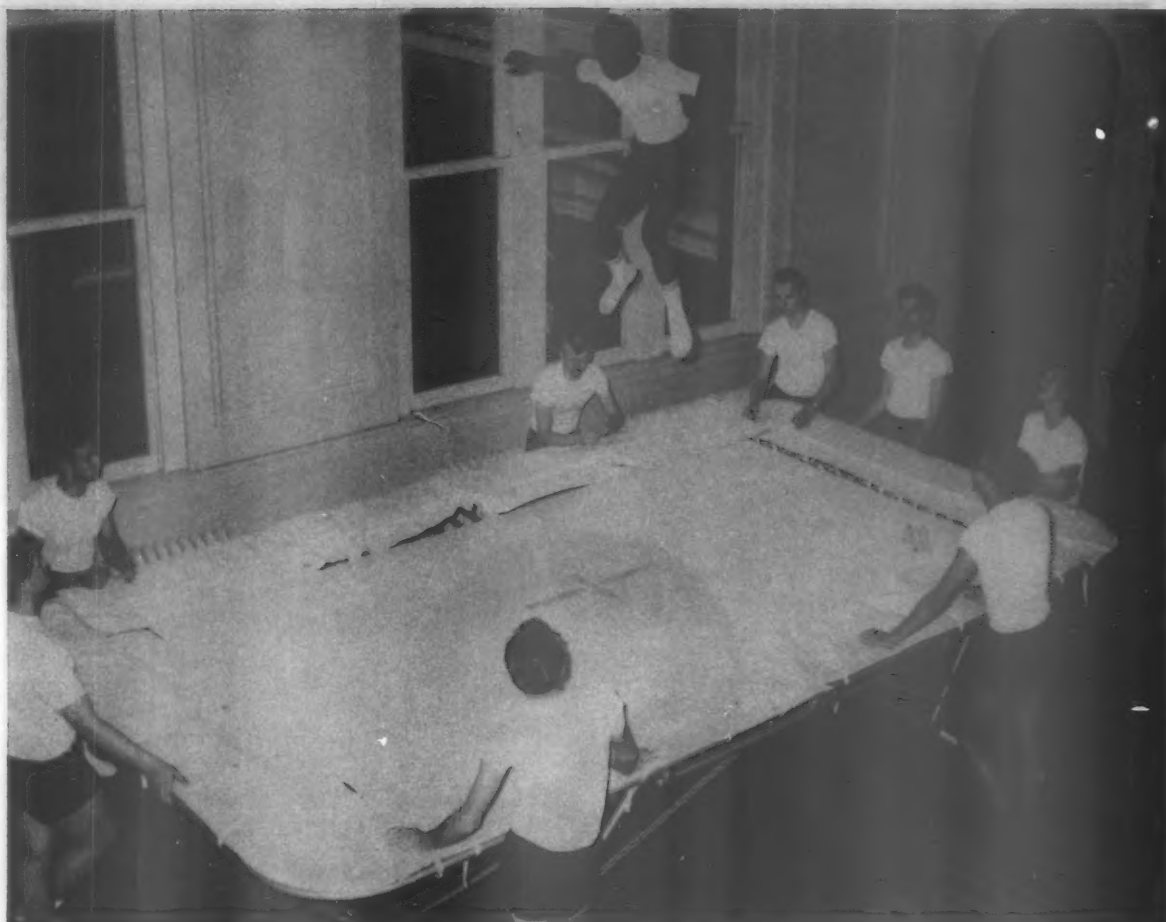
is to have two lines running at top speed, face dodging the pad, on their high-hand side.

The second dodge, the dip dodge, is executed on the pad on the low-hand side. A player approaches, with his high hand inside, and brings the stick across his body and down parallel to the ground on the low-hand side (Illustration 2), stepping by the pad, and protecting the stick with his body and high-hand shoulder. Two lines are run at the pads.

The third dodge, the circle dodge, is executed on the pad on the high-hand side. The player approaches the pad, throws his foot on the high-hand side (left shot, left foot), reverse pivots, and comes out (Illustration 3) on his high-hand side. In the beginning, slow, deliberate movements are used. As technique is developed, speed is encouraged. On this dodge heavy contact into the pad is demanded. The jolt forces the player to cradle the ball well in order to keep it in the stick.

Two types of contact, the shoulder block and hip check, are stressed on the blocking pan. Many boys out for lacrosse have never shoulder blocked. They are started in a semi-crouch position, and the uncoil, straight back, rear leg line (Illustrations 5 and 6) are emphasized. After form is achieved, running shoulder blocks from two to three yards away are used. These are made with the low-

(Continued on page 68)



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Illustration 1



Illustration 2

Prevention and Treatment of Track Injuries

By ALLAN SAWDY

Trainer, Bowling Green State University, Bowling Green, Ohio
and

DR. DAVID O. MATTHEWS

*Intramural Sports Director,
Bowling Green State University, Bowling Green, Ohio*

DURING every track season the coach is faced with the possibility of injuries to his runners. Therefore, he must know what the most common types of injuries are, their cause, prevention, and treatment. Our discussion is limited to three areas of the body which are injured most frequently. These areas are the feet, the lower leg, and the thighs.

Feet

Blisters. Excessive friction may cause the epidermis to become separated from the dermis with a resultant accumulation of fluid in the intervening space. The ordinary blister is no cause for alarm, but if neglected, may develop into a serious infection.

In order to prevent blisters, such pre-practice aids as alum water baths, benzoin with zinc powder, and other skin tougheners are recommended. Proper fitting shoes and socks which are neither too tight nor too loose, are also important factors in preventing blisters.

If during or after running, the athlete senses *hot spots*, a burning, numbness or other unusual sensations, he should stop practice for the day and bathe his feet in cold water. This im-

mediate care of blisters is of extreme importance. If the epidermis is still intact and the *bubble* is clearly evident, sterilize the area thoroughly by cleansing with alcohol. Use a sterilized needle or a sharp lance to puncture the blister at its base and allow the fluid to drain. Slight pressure will help in getting all of the lymph or blood out. If possible, allow the skin to remain intact. Sometimes the epidermis breaks, making it necessary to cut away the flaps of skin. When the skin no longer covers the dermis, the area should be considered as a wound and treated as such.

The steps to follow in treating a broken blister are: (1) cleanse the wound and the surrounding area with sterile soapy gauze; (2) sterilize the wound with merthiolate or other suitable antiseptic; and (3) cover the wound with a non-adhering sterile dressing or apply a gauze pad covered with a bland ointment. As a further precautionary measure, an unhealed blistered area should be well cushioned during practice or competition.

Heel Bruises. The hurdler, pole vaulter, broad jumper, and high jumper are the individuals who are the most susceptible to injury of the heel. Constant pounding of the heel on a hard surface produces a bruising of the soft

tissue and possibly the periosteal covering of the heel bone. If the injury involves the periosteum, the damage will be more severe and recovery will take longer.

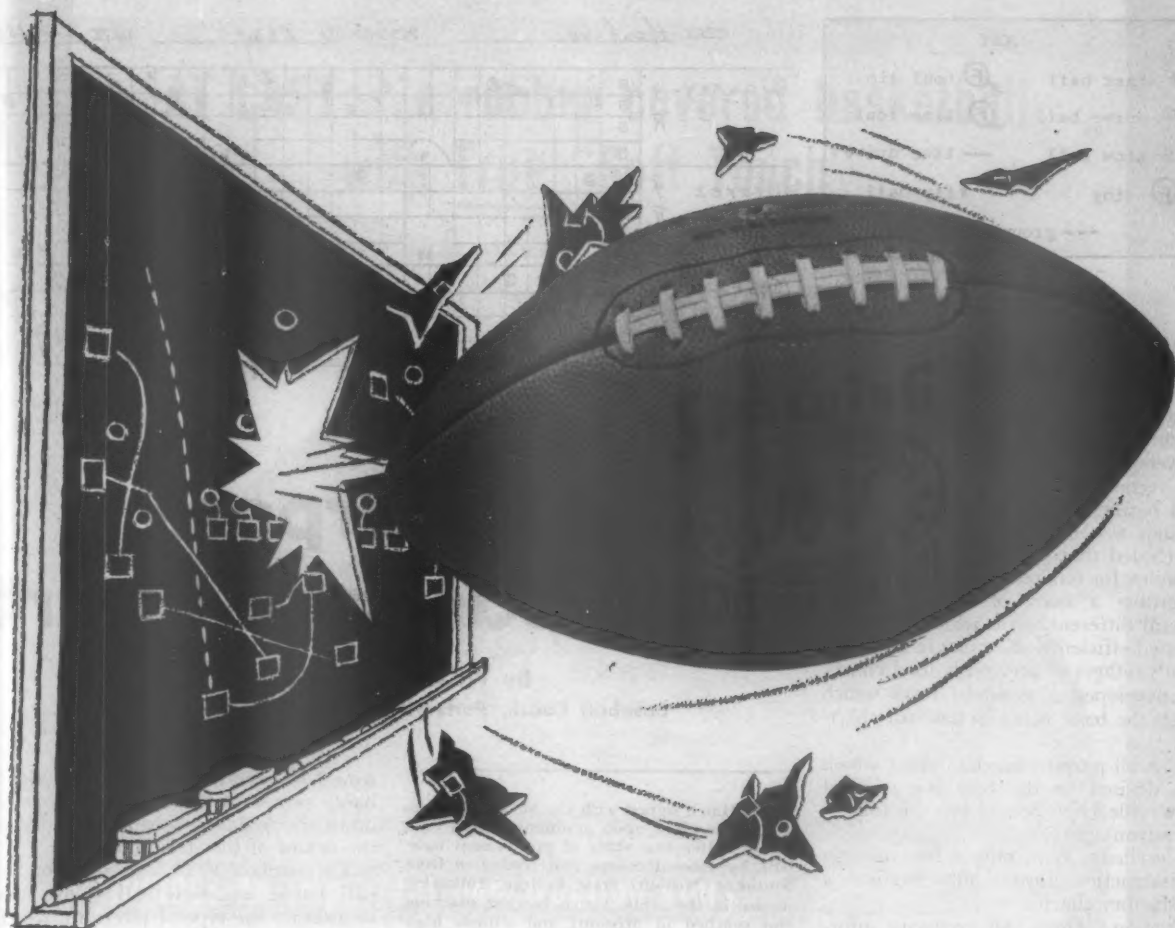
Prevention of this serious problem seems to be the most sensible approach for the coach and the athlete. Two suggested methods of prevention are:

1. Fashion a heel cushion from one-quarter inch vinyl and place it in the

(Continued on page 53)

Illustration 3





"BREAKTHROUGH!"

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KEY	
F fast ball	 foul tip
C curve ball	 line foul
S slow ball	— line drive
 swing	 fly ball
--- grounder	

CHARTING is becoming an increasingly necessary tool in successful baseball coaching. Not only does a good chart point out individual faults in the pitching and batting of a coach's own players, but it may also serve as a scouting record of the opposition's pitching and batting. After experimenting with various systems for several years, we concluded that most of them were too complex for our purposes, and we were recording a maze of information on several different forms which could not be used efficiently. Keeping in mind the disadvantages of previously used charts, we developed a standard form which meets the basic needs in baseball charting.

The all-purpose baseball chart which was devised by the coaching staff of Porterville High School has the following advantages:

Simplicity. With only a few minutes of instruction anyone may become a satisfactory charter.

Standard Form. All necessary information may be recorded on standard forms, thus insuring simplicity and ease of interpretation.

Complete Record. Every pitch of the game is recorded as to type, location, and what the batter does with it.

Diagnosis. By interpreting the results of the chart, individual weaknesses may be found which might otherwise go undiscovered.

Scouting Record. Not only does the all-purpose chart provide a record of opponents for future pitching and batting strategy, but it also provides a running account for the pitcher in the present game on how he pitched to the batters in their previous times at bat.

For economy our all-purpose chart is mimeographed on plain ditto paper eight and one-half by eleven inches and stapled to a cardboard backing. We also find this to be the most convenient size for carrying and filing. The chart is divided into nine horizontal parts one inch wide, corresponding to the nine positions of the batting order. Each part is then divided into a one and one-half by one inch section which contains the batter's name, position, which way he swings, and three times-at-bat sections each two inches by one inch. Within each time-at-bat section there are four-

TEAM <u>Hanford</u>		PITCHER <u>O'Neal</u>		DATE <u>3/29/59</u>	
Blankey 3	R	B	B	B	B
		B	B	B	B
		B	B	B	B
		B	B	B	B
Alvarez 9	R	B	B	B	B
		B	B	B	B
		B	B	B	B
		B	B	B	B
Medrano 4	R	B	B	B	B
		B	B	B	B
		B	B	B	B
		B	B	B	B
Casillas		B	B	B	B

Diag. 1

The All-Purpose Baseball Chart

By WILLIAM H. HATCH

Baseball Coach, Porterville, California, High School

Bill Hatch signed with the St. Louis Cardinal organization upon graduation from high school. After two years of professional baseball, he entered college and graduated from Southeast Missouri State College. Following service in the army, Hatch entered coaching and coached in Missouri and Illinois high schools before moving to California a year ago.

teen pairs of boxes one-quarter inch square and a larger box one-half inch square. Each pair of boxes represents one pitch — the upper boxes, headed by the symbol S record the strikes, while the lower boxes headed by the symbol B, record the balls. The larger box is used to record what the batter did with the last pitch. Diagram 1 shows the first three batters of a complete chart.

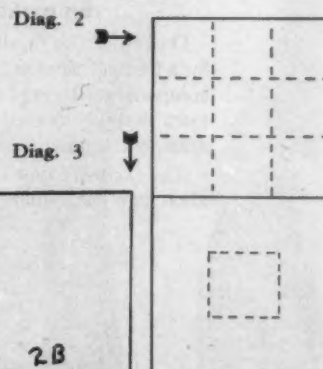
All pitches are recorded in the appropriate box as to location and type. An enlargement of one pair of strike and ball boxes is shown in Diagram 2. Imaginary lines have been drawn in to show the locations within the strike box and to indicate the boundary of the ball area in the ball boxes. In charting a strike, the type of pitch would be recorded in its proper location within one of the imaginary divisions of the strike box, while a ball would be recorded in its proper location in the ball box but outside the imaginary boundary lines. A letter high inside corner pitch to a right-handed batter would be recorded in the upper left-hand corner of the strike box, while a low outside pitch

would be recorded in the lower right-hand corner of the ball box. A pitch down the middle would be recorded in the center of the strike box.

The symbols F, C, and S — for fast ball, curve, and slow ball — are used to indicate the type of pitch thrown. If the batter swings, the symbol is circled. If the batter swings at a bad pitch, the symbol is recorded in the proper position in the ball box and circled. If the batter foul tips a pitch, it is recorded in the proper box by connecting a wavy line to the bottom of the circle. Any other foul would be indicated by a straight line connected to the circle pointing in the direction of the foul.

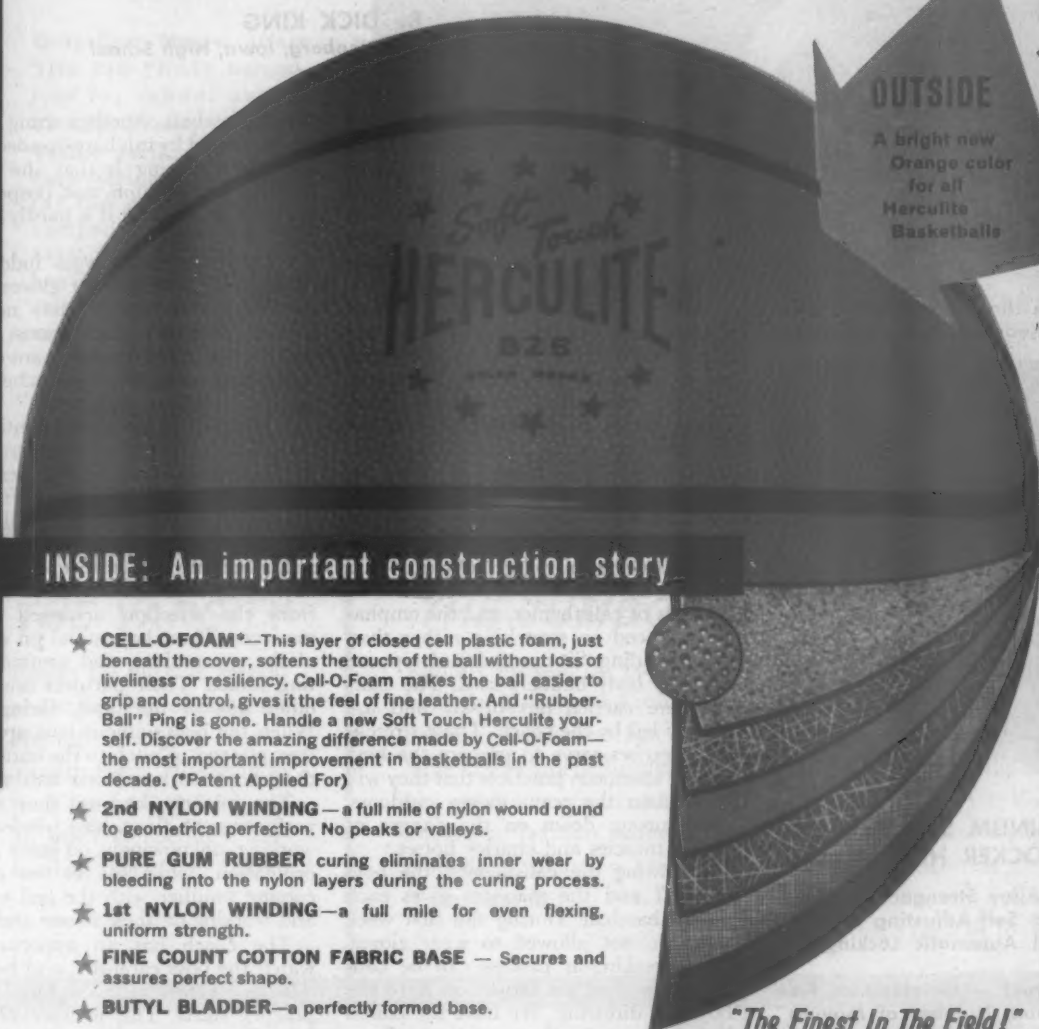
Diagram 3 shows an enlargement of the box which records the result of the batter's action on the last pitch to him.

(Continued on page 57)



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Practicing Baseball Indoors

By DICK KING

Baseball Coach, Guttenberg, Iowa, High School

INDOOR baseball practice has always been, and is today, a situation filled with problems and the anticipation of accidents. Many superintendents frown upon the idea of baseballs being thrown inside the building, and some gymnasiums have many windows, which make indoor baseball seem foolhardy.

Early spring weather in this part of the country is quite unpredictable, but it is usually damp. In order to be prepared in some way for the first game, we have been forced to make use of our rather small gymnasium. After some experimentation, a plan was developed which allows us to make full use of the first two weeks of practice and at the same time use some methods which we feel are a great help in preventing early-season sore arms and charley horses.

Each day's practice is started with 15 minutes of calisthenics, and the emphasis is placed on stretching rather than body-building. Sit-ups and push-ups are the only body builders used. The exercises are carried out briskly and are usually led by the coach. These stretching exercises serve to prepare the boys for the strenuous practices that they will face when the team moves outdoors, thus cutting down on the danger of pulled muscles and charley horses.

Following the calisthenics, the boys pair off and the manager gives each pair a baseball. During the first week they are not allowed to wear gloves. This breaking-in process can be controlled because we know how hard the boys are throwing. We have the paired boys face each other across the floor, usually from 35 to 40 feet apart. Then the coach walks behind the rows, encouraging an elaborate wind-up and follow-through, to put all of the throwing muscles into play.

By depriving the boys of gloves, the first week of throwing will be at a little less than half-speed. At the same time, their hands are being toughened and the boys are forming a two-handed habit. It is not required that every catch be made with two hands, and we do not expect to see all boys play one-

armed baseball. Another thing that is accomplished by this bare-handed catching and throwing is that the danger involved to life, limb, and property has been cut down until it is hardly a problem.

During the second week indoors the boys are allowed to wear gloves. Again two lines are formed, but now the catching line is placed against a windowless wall. The throwers are allowed to throw harder, but the catchers must return the ball underhand.

While half of the squad continues to throw on half of the gymnasium floor, the other half of the squad uses a drill that is designed to introduce them to baseball bats, and to develop balance, coordination, and grace.

Let us say there are eight pairs of boys. Eight of the boys receive bats from the selection arranged by the manager. These boys stand on one side of the gymnasium, and assume a batting stance. Their partners are on the other side of the floor, facing them. When the boys without bats are ready, they pretend to pitch to the batters, and these boys work on their batting form.

The pitchers, because they tend to perform great, flourishing wind-ups, are working, unknowingly, on grace and coordination, while the batters are becoming familiar with the feel of a bat and working on their stance and swing.

The coach has an opportunity to watch the boys carefully, and help iron out flaws before actual outdoor batting practice starts. This is especially helpful when the time between the first practice and the first game is short.

At the other end of the gymnasium, half of the squad continues to throw. Here, again, the coach can spend some time on each boy, helping to smooth his motion or improve his style.

All of our practices end with hard running drills which develop stamina, wind, and legs. When it is not raining, the boys are directed over a three-quarter mile course. When the weather is really unfavorable, sprints are con-

(Continued on page 61)

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Pointers on Pace and Position

By W. HAROLD O'CONNOR

Track Coach, Concord, Massachusetts, High School

COACHES who were fortunate enough to see the Russian-American track meet in Philadelphia last July had an opportunity to learn two different lessons about the importance of pace and position in distance racing. First, let us consider the internationally publicized 10,000 meter run. Thousands at the meet saw Bob Soth and Hubert Pyarnakivi race themselves into exhaustion by following an early pace too fast in hot, humid weather which took a great toll of the strength of both. They also saw the last-ditch effort of Max Truex, who after falling far off the early pace, also overtaxed his strength in trying to close the long gap separating him and the obviously tottering Soth and Pyarnakivi. Only the utter exhaustion of the Russian enabled Truex to move into second place in the last couple of hundred yards of the race.

We have never seen a more dramatic demonstration of the points we intend to emphasize in this article. There seems to be a never-ending discussion among coaches about the advisability of instructing runners to go out fast, build up an early lead, and fight off challengers as opposed to a caution to lay off the early pace, get into good striking position, and strike quickly from behind in the late stages of the race. Debate waxes strong over the question of how fast an early pace should be as well as how far off the pace a man should stay if he is to strike successfully in order to win. Desyatchikov, the Russian winner of the 10,000 meters, demonstrated effectively the strategy of forging into a lead, building up that lead steadily, and then taking the field along with him to its own downfall. Pyarnakivi and Soth, following at the leader's heels in a pun-

ishing 9:20 first two miles, paid the price of utter exhaustion in the sixth mile. Daring and determination, even raw courage itself, could not compensate for the fatal mistake of adhering to a killing early pace on a hot, humid day which made even walking a tiring effort.

On the other hand, consider Truex. Early in the race Max felt the demands of Desyatchikov's pace and began to fall back. It seemed as though he began to feel the pace quickly, while Soth whom he had defeated by a good margin in the battle for the team, raised the American hopes by clinging to the flying Russians. Truex finally fell back a little more than half a lap and was running apparently out of contention when things began to happen up ahead. Soth began to pay the price of his daring, and from far back Pyarnakivi rose to the encouragement of his Russian teammates and with a costly effort caught and passed the failing Soth. With little more than a lap to go the crowd sensed that the Russian also was on the verge of collapse and the roar went up for Truex to move. This he certainly did with a speed that seemed unbelievable from a man in his spent condition. However, the point which should be emphasized, all the drama notwithstanding, is that for Truex to catch and pass the Russian from his position far back, it was necessary that Pyarnakivi be literally exhausted and almost running in place. Had Pyarnakivi been able to move at even a slow trot, the Russian would have made Truex's effort a wasted one.

Being interested in the mathematical aspects of this phase of racing, we sought out a mathematician in our high school who is also interested in track, and plied him with questions. One of our questions was how big a lead at a given pace would be impossible to overcome should a runner fall far off the pace in the early stages of the race.

Remembering that speed is not constant from the start of a race, but that

(Continued on page 50)

"Skip" O'Connor has written numerous track articles during his lengthy and successful coaching career at Concord, Massachusetts, High School. His teams have won more than 150 dual meets plus 46 league, state, and sectional championships including six consecutive state indoor titles.

NOTEBOOK OF DEFENSIVE FOOTBALL DRILLS

THE two-on-one drill (Diagram 13) is similar to the one-on-one in organization, and possibly from a defensive standpoint is the most rugged. All players on the squad should be used as offensive men. The backs need two-on-one blocking experience, especially at the present time when most teams use some form of multiple offense. In order to double-team on the tackles, the single wing wingback or flanker must join with his end.

The tackles should be used first, and then the guards and centers. Proper alignment is shown in Diagram 13. All movements are similar to those used in the one-on-one drill with the exception of the four offensive lines which are made up of pairs of blockers. Starting signals, direction of block, etc., remain the same. Each defensive man should use every trick he has been taught in order to penetrate.

About ten scrimmages should be sufficient for each defensive man. Offensively, the lines should keep moving. The first two players should block and then go back to the end of the line. Sometimes it is wise to let each offensive pair hit three times and then move back to the end of the line. It is also feasible to have one offensive line made up solely of ends and backs. This group should line up for scrimmage with the back one yard back of his end and to his outside. In this case, due to the number of backs, they must be mixed with the line-

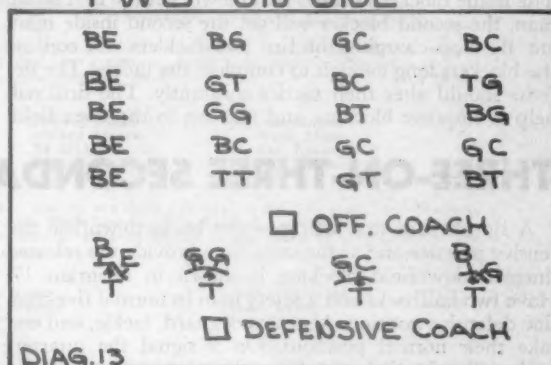
The roll-off (Diagram 14) is combined with the two-on-one, and should be run from the same alignment dur-

TWO-ON-ONE DRILL 13

men. However, they should still take regular backfield positions.

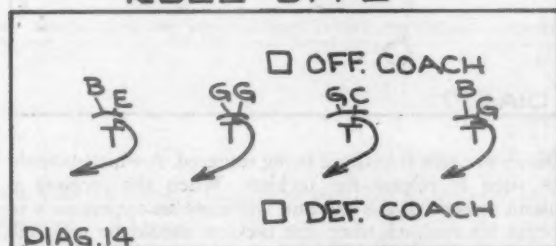
The two-on-one should be the toughest drill in the defensive repertoire. A great deal of motivation is necessary to make it rough. Once the season gets underway this drill should be conducted at least twice a week.

TWO-ON-ONE



ROLL-OFF DRILL 14

ROLL-OFFS



The trap drill (Diagram 15) is also combined with the two-on-one and is always a surprise to the defensive man. He never knows when it is coming so he must be mentally alert at all times. While conducting the normal two-on-one drill the coach should have a prearranged signal with the offensive blockers. The players assume their

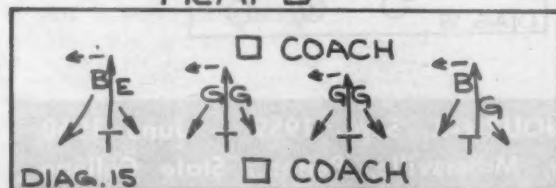
ing the two-on-one drill. The difference lies in the signals given by the defensive coach. When he gives the starting signal to the offensive blockers and signifies the direction of the drive or block, he tells the defensive players to roll away from the pressure. Thus the defensive lineman should hit on the signal. As soon as he feels the pressure from either side, he should drop to his inside knee and throw his body into a spin away from the pressure. He should throw his free foot back as far as possible, wheel back on his hands, drop three to four yards on all fours, and then regain his feet as he completes the maneuver.

TRAP DRILLS 15

positions and on the signal the two offensive men spread as they shoot forward. The defensive men usually fall forward on their charge into the secondary. They must react quickly in regaining their feet and turning inward to meet a possible trapper. As they do, they should brace themselves in either a low stance or by dropping to one knee. The idea is to jam the trapper and block the hole.

This drill will definitely show the defensive coach whether his men are lunging or charging. He will be surprised to find that 90 per cent of the time the defensive player lunges and loses his feet. From a defensive standpoint this is a serious fault which should be corrected immediately.

TRAPS

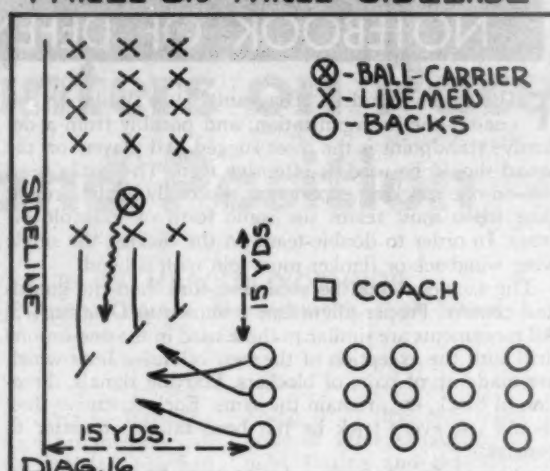


16 THREE-ON-THREE SIDELINE

This drill, as shown in Diagram 16, combines offensive line blocking with defensive backfield play. However, it can be reversed by exchanging groups on every maneuver, thus giving both offensive and defensive practice to every player.

The linemen should position themselves along the sideline three abreast. One lineman serves as a ball-carrier. The backs are lined up three abreast facing the sideline about fifteen yards inside the playing field. They are stationed fifteen yards downfield from the linemen. On the coach's signal the blockers try to convoy the ball-carrier by the three tacklers. The tacklers should come across fast and mix up their line of charge to confuse the blockers. This maneuver is used to prevent the blockers from peeling off in one, two, three order on the tacklers. The inside blocker assumes that he will get the first inside man, the second blocker will get the second inside man, etc. By cross-charging the first two tacklers will confuse the blockers long enough to complete the tackle. The defense should alter their tactics constantly. The drill will help to improve blocking and tackling in the open field.

THREE-ON-THREE SIDELINE



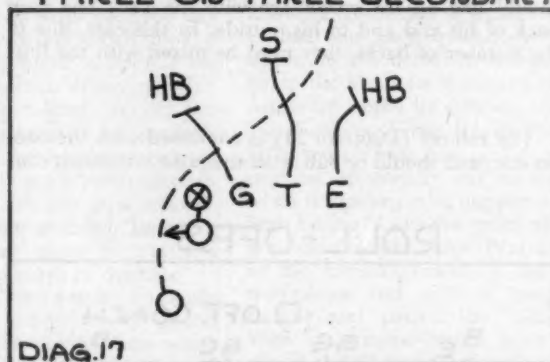
17 THREE-ON-THREE SECONDARY

A simple drill that will give the backs downfield defensive practice and at the same time provide the released linemen downfield blocking is shown in Diagram 17. Have two halfbacks and a safety man in normal five-man line defensive position. Also have a guard, tackle, and end take their normal positions. On a signal the quarterback will take the snap from the center and give the ball to a back on a hand-off to the weak side. The linemen release immediately and attempt to block the three backs who are trying to avoid the blocks in order to make the tackle.

If desired, a linebacker can be added to the strong side, and he becomes the sole responsibility of the center.

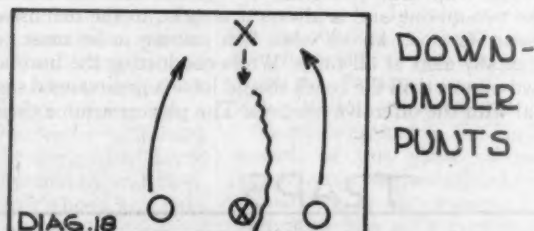
A new ball-carrier and fresh linemen come in to replace the three who released. The three defensive men remain on defense for at least five or ten plays.

THREE-ON-THREE SECONDARY



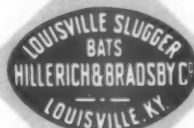
18 DOWN-UNDER PUNTS

Practically every coach uses the drill shown in Diagram 18 during pre-season practice because it gives him a picture of the spirit and aggressiveness of his boys. There are no blockers; the centers take turns centering; and all of the punters take turns at punting. The coach receives information on the centering ability of the centers, finds his punters, and is able to form conclusions on possible safety men. In the latter case, he should have his fastest backs acting as punt receivers. The drill also combines defensive skills because the other players form in two lines ten yards on each side of the center. Their function is to go down under the punt, force the runner up the middle, and then tackle him. Open field running and tackling practice are provided. The tacklers should not go downfield too soon. If they release as soon as the center passes the ball back to the punter, the receiver will have little opportunity to catch it without being smeared. A whistle should be used to release the tacklers. When the receiver is about to control the ball and will have an opportunity to begin his runback, then the tacklers should be released. Another point is that the centers, punters, and in turn the safety men receive few opportunities to go down under the punts for open field tackling practice.



Prepared as a feature of ATHLETIC JOURNAL, Sept. 1959 — June 1960
By George A. Katchmer, Football Coach, Millersville, Penna., State College

1960



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Genuine Autographed

BASEBALL BATS

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125 GENUINE AUTOGRAPHED LOUISVILLE SLUGGER—POWERIZED. Natural ash white finish. Turned from choice, open-air-seasoned white ash. Genuine autographed models of the twenty sluggers listed below comprise the No. 125 line. An assortment of not fewer than six different models is guaranteed to each carton of one dozen. Packed 4/33", 5/34", and 3/35" bats in each carton. Shipping weight, 27 pounds. **Each \$4.60**

MODELS:

Henry Aaron
Richie Ashburn
Ernie Banks
Yogi Berra

Orlando Cepeda
Bob Cerv
Rocky Colavito
Joe Cunningham

Nelson Fox
Al Kaline
Harmon Killebrew
Ted Kluszewski

Harvey Kuenn
Mickey Mantle
Ed Mathews
Jackie Robinson

Duke Snider
Frank Thomas
Gus Triandos
Ted Williams

125S SPECIAL AUTOGRAPHED LOUISVILLE SLUGGER—POWERIZED. (Not illustrated). Quality and finish identical to No. 125 above, but turned to slightly smaller dimensions for the particular requirements of High School, Prep School, Babe Ruth League, Pony Baseball, and other teen-age players. Listed below are the autographed models in the 125S group. An assortment of not fewer than six different models is guaranteed to each carton of one dozen. Packed 4/32", 5/33", and 3/34" bats in each carton. Shipping weight, 24 pounds. **Each \$4.60**

MODELS:

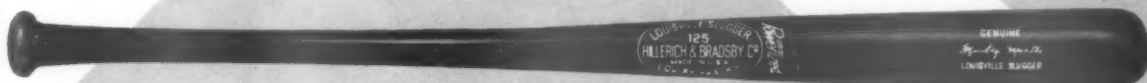
Henry Aaron
Richie Ashburn
Yogi Berra

Rocky Colavito
Al Kaline
Harmon Killebrew

Harvey Kuenn
Mickey Mantle
Ed Mathews

Jackie Robinson
Duke Snider
Ted Williams

43 ASH FUNGO. GENUINE LOUISVILLE SLUGGER—POWERIZED. (Not illustrated). Quality and finish identical to No. 125 above. Each carton of one dozen contains three (34") infield and nine (37" and 38") outfield fungoes. Shipping weight, 20 pounds. **Each \$4.60**



125 EBONY FINISH—GENUINE AUTOGRAPHED LOUISVILLE SLUGGER—POWERIZED. Turned from choice, open-air-seasoned timber. Rich ebony finish with gold branding. Six different models are guaranteed to each carton of one dozen. Packed 4/33", 5/34", and 3/35" bats in each carton. Shipping weight, 27 pounds. **Each \$4.60**



150 GRAND SLAM—Natural white finish. Turned from select northern white ash timber. Patterned after the original models of the famous sluggers whose names they bear. Six different models guaranteed to each carton of one dozen. Lengths 4/33", 5/34", and 3/35" bats in each carton. Shipping weight, 28 pounds. **Each \$3.60**

150S SPECIAL GRAND SLAM—(Not illustrated). Quality and finish identical to No. 150 above, but turned to slightly smaller dimensions for the particular requirements of High School, Prep School, Babe Ruth League, Pony Baseball, and other teen-age players. Six different models guaranteed to each carton of one dozen. Lengths 4/32", 5/33", and 3/34" bats in carton. Shipping weight, 24 pounds. **Each \$3.60**



140S SPECIAL POWER DRIVE. Natural white finish. Turned from fine white ash. Patterned after the original models of the famous sluggers whose names they bear, but turned to slightly smaller specifications for the particular requirements of High School, Prep School, Babe Ruth League, Pony Baseball, and other teen-age players. Six different models guaranteed to each carton of one dozen. Assorted lengths 32" to 34"; shipping weight, 25 pounds. **Each \$3.10**

Bats for PONY BASEBALL

Numbers 125S, 150S, 140S, and 130S (also the Junior and Little League numbers) are approved for PONY BASEBALL play. These numbers are particularly suitable for players of this age group.

Bats for BABE RUTH LEAGUE

Any baseball bat in the Louisville Slugger line not longer than 34" may be used in BABE RUTH LEAGUE play. However, the "specials" (125S, 150S, 140S, and 130S) are particularly suitable for players of this age group.

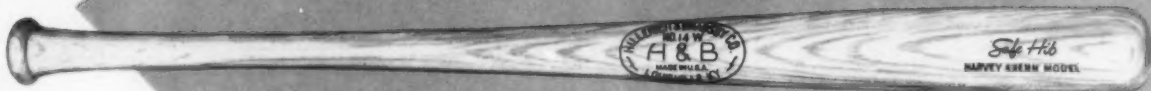
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Also Makers of Grand Slam Golf Clubs

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H & B BASEBALL BATS



14W SAFE HIT. Finished in natural ash white and supplied in an assortment of famous sluggers' models in each carton of one dozen. Assorted lengths from 32" to 35"; shipping weight, 26 pounds. Each \$2.70



11B BIG LEAGUER. Black finish with white tape grip. An assortment of famous sluggers' models in each carton of one dozen. Lengths range from 32" to 35"; shipping weight, 27 pounds. Each \$2.30



130S SPECIAL SAFE HIT. Turned from ash with rich dark maroon finish. Patterned after original models of the famous sluggers whose names they bear, but turned to slightly smaller specifications for the particular requirements of High School, Prep School, Babe Ruth League, Pony Baseball, and other teen-age players. Six different models guaranteed to the carton of one dozen, assorted lengths 32" to 34"; shipping weight, 24 pounds. Each \$2.30



9 LEADER. Light brown finish. Assorted famous sluggers' models. Assorted lengths, from 32" to 35"; shipping weight, 27 pounds. Each \$1.80

LITTLE LEAGUE

Performance makes them Famous



AND JUNIOR BATS



125LL GENUINE AUTOGRAPHED LITTLE LEAGUE LOUISVILLE SLUGGER. Large-size junior bat. Turned from select, open-air-seasoned white ash and hickory. Each carton of one dozen contains approximately half with natural white finish and half with antique finish. Autographs of Henry Aaron, Yogi Berra, Rocky Colavito, Nelson Fox, Mickey Mantle, and Ted Williams. Packed 3/29", 4/30", 3/31", and 2/32" bats in each carton. Shipping weight, 21 pounds. Each \$3.50



125BB GENUINE AUTOGRAPHED LITTLE LEAGUE LOUISVILLE SLUGGER—EBONY FINISH. Large-size junior bat. Turned from select open-air-seasoned timber. Imprinted white tape grip. Autographs of Henry Aaron, Yogi Berra, Rocky Colavito, Nelson Fox, Mickey Mantle, and Ted Williams. Lengths, 3/29", 4/30", 3/31", and 2/32" bats in each carton. Shipping weight, 22 pounds. Each \$3.10



125J GENUINE AUTOGRAPHED LITTLE LEAGUE LOUISVILLE SLUGGER. Medium-size junior bat. Turned from select open-air-seasoned ash. Approximately half of the 125J bats have natural finish as shown above; the other half have an ebony finish. Autographs of Henry Aaron, Yogi Berra, Rocky Colavito, Nelson Fox, Mickey Mantle, and Ted Williams. Lengths 3/29", 4/30", 3/31", and 2/32". Shipping weight, 20 pounds. Each \$2.70



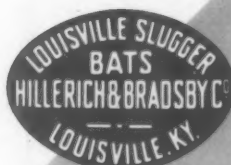
JL LITTLE LEAGUE "It's a Louisville." Large-size junior bat with two-tone black barrel and white handle finish. Each bat contains the name of one of these famous hitters: Henry Aaron, Yogi Berra, Rocky Colavito, Nelson Fox, Mickey Mantle, and Ted Williams. Lengths 29" to 32". Shipping weight, 21 pounds. Each \$2.30



J2 LITTLE LEAGUE. Large-size junior bat. Light brown finish. Each bat branded with name of one of these famous hitters: Henry Aaron, Yogi Berra, Rocky Colavito, Nelson Fox, Mickey Mantle, and Ted Williams. Lengths 29" to 32". Shipping weight, 20 pounds. Each \$1.80

LOUISVILLE SLUGGER

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125Y LOUISVILLE SLUGGER OFFICIAL SOFTBALL BAT—MODEL 12. For the consistent hitter, a small-barreled bat with gradual taper to small grip. Antique finish. Finest selection of second-growth ash and/or hickory. One dozen to carton, 6/33" and 6/34"; shipping weight, 24 pounds. **Each \$3.40**



125SP LOUISVILLE SLUGGER "SLOW-PITCH" SOFTBALL BAT—ASSORTED OFFICIAL MODELS. Designed for the rapidly expanding game of slow-pitch softball and the more experienced player preferring a bat with more heft. Antique finish hickory. One dozen in carton, 6/33" and 6/34"; shipping weight, 28 pounds. **Each \$3.25**



125W LOUISVILLE SLUGGER OFFICIAL SOFTBALL BAT. Assortment of popular models packed in carton of one dozen. Turned from select ash and/or hickory, and Powerized. Finished in natural ash-white. Lengths, 6/33" and 6/34"; shipping weight, 23 pounds. **Each \$3.25**



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125C LOUISVILLE SLUGGER OFFICIAL SOFTBALL BAT—MODEL 8. "Fast-Swing" model for hitting fast pitching. Bottle-shaped large barrel that tapers quickly to small grip. Natural white finish. Turned from select ash and/or hickory, and Powerized. One dozen to carton, 6/31" and 6/32"; shipping weight, 24 pounds. **Each \$3.25**



250B LOUISVILLE SLUGGER "ROCKET" SOFTBALL BAT—ASSORTED OFFICIAL MODELS. A splendid variety of models—answers full team requirements. Ebony finish. Turned from select ash and/or hickory. One dozen in carton, 6/33" and 6/34"; shipping weight, 24 pounds. **Each \$3.25**



125T LOUISVILLE SLUGGER OFFICIAL SOFTBALL BAT—MODEL 6. For heavy hitters—a bottle-shaped model with large barrel, tapering quickly to a medium grip. Natural white finish. Turned from select ash and Powerized. One dozen to carton, 6/33" and 6/34"; shipping weight, 24 pounds. **Each \$3.25**



250C LOUISVILLE SLUGGER OFFICIAL SOFTBALL BAT—MODEL 8. "Fast-Swing" model for hitting fast pitching. Bottle-shaped—large barrel that quickly tapers to small handle. Ebony finish. Turned from select ash and/or hickory and Powerized. Each carton, 6/31" and 6/32". Shipping weight, 25 pounds. **Each \$3.25**



125L LOUISVILLE SLUGGER OFFICIAL SOFTBALL BAT—MODEL 1. For girl hitters. A small-barreled bat with gradual taper to a small grip. Natural white finish ash and Powerized. One dozen in carton, 33" lengths. Shipping weight, 20 pounds. **Each \$3.25**

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102 LOUISVILLE SLUGGER OFFICIAL SOFTBALL BAT. Assorted popular softball models of first quality ash and hickory. Oil Tempered and finished in saddle brown. Packed one dozen to carton, 6/33" and 6/34"; shipping weight, 24 pounds. Each \$2.90



100SP LOUISVILLE SLUGGER SLOW-PITCH OFFICIAL SOFTBALL BAT. Turned from high quality ash and/or hickory and finished in medium brown. One dozen in carton, 6/31" and 6/32"; shipping weight, 24 pounds. Each \$2.90



100W LOUISVILLE SLUGGER OFFICIAL SOFTBALL BAT. Assorted popular softball models. Turned from high quality ash and/or hickory. Natural white finish and Oil Tempered. One dozen in carton, 6/33" and 6/34"; shipping weight, 22 pounds. Each \$2.90



56 "It's a Louisville" OFFICIAL SOFTBALL BAT, Natural finish. Ash and/or hickory. Green zapon grip. One dozen assorted models in carton, 33" and 34" lengths; shipping weight, 23 pounds. Each \$2.20



54 "It's a Louisville" OFFICIAL SOFTBALL BAT. Assorted models turned from ash and hickory. Brown finish and black zapon grip. One dozen in carton, 6/33" and 6/34"; shipping weight, 23 pounds. Each \$2.20



54C "It's a Louisville" OFFICIAL SOFTBALL BAT—Bottle-shaped "Fast Swing" model. Made of ash and hickory, with ebony brown finish. One dozen in carton, 6/31" and 6/32"; shipping weight, 24 pounds. Each \$2.20



54L "It's a Louisville" OFFICIAL GIRLS' MODEL. Natural white finish ash with blue zapon grip. One dozen in carton, 33" length; shipping weight, 19 pounds. Each \$2.20



52H OFFICIAL SOFTBALL BAT. Turned from ash and/or hickory and finished in ebony. One dozen assorted models to carton, 33" and 34" lengths; shipping weight, 23 pounds. Each \$1.80



51H OFFICIAL SOFTBALL BAT. Turned from ash and/or hickory with maroon finish and gray zapon grip. Assorted models. One dozen to carton, 33" and 34" lengths; shipping weight 23 pounds. Each \$1.70



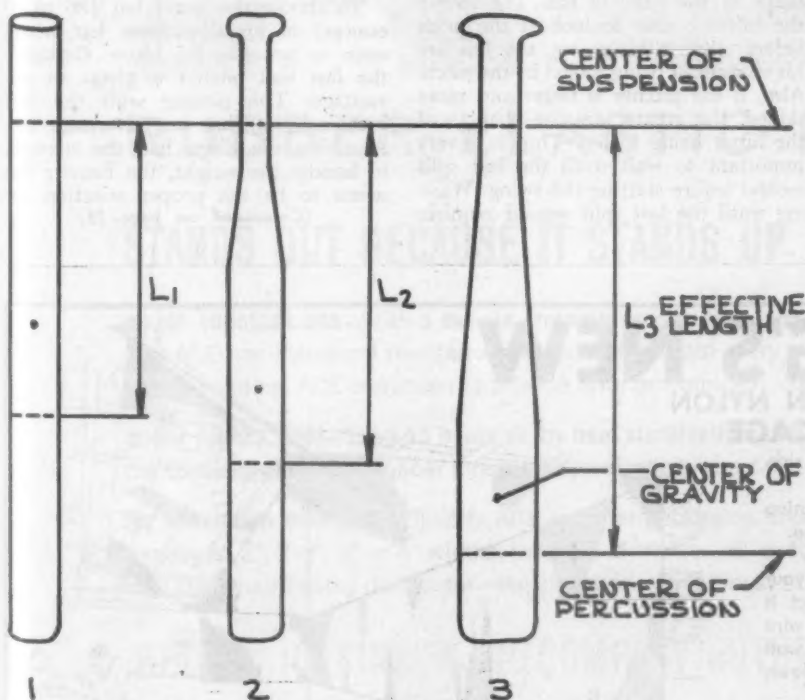
50 OFFICIAL SOFTBALL BAT. Brown finish. One dozen assorted models to carton, 33" and 34" lengths; shipping weight 22 pounds. Each \$1.30

In Softball as in Baseball... One Trademark stands Supreme

Selecting the Baseball Bat

By THOMAS F. JOHNSON
Baseball Coach, Howard University
and

DR. HALSON V. EAGLESON
Professor of Physics, Howard University



BATS HAVING EQUAL LENGTH
AND WEIGHT

$$L_1 < L_2 < L_3$$

BATTING is a complex skill. As he steps into the batter's box, the hitter takes with him three vital pieces of equipment — a bat, mental attitude, and certain physical attributes. This discussion is concerned with the bat, the hallmark of baseball. The delimitation does not minimize other basic hitting concepts and fundamentals. Nevertheless, it is generally agreed that there is nothing the baseball player uses that is more valuable to him than his bat.

Because bats are extremely important, great care should be taken when selecting them. Too often the amateur player is satisfied with *feel*. In his case how the bat feels is the sole criterion for selection. Certain features of bats, essential for hitting excellence, are beyond the scope of the amateur athlete. He must depend on the integrity of the manufacturer for such features as types and grades of wood, seasoning, design, etc. However, knowledge of these basic factors and the laws of physics as applied to hitting are of value. Mass, velocity, momentum, angular motion, center of gravity, center of percussion, conservation of momentum, and Newton's third law of motion are some of the important principles. Also the athlete's physical strength, hand-wrist speed, and reaction time are items that should influence bat selection. The type of pitching to be faced is also a factor to be considered when selecting the bat best suited to the individual.

Bat selection is a profoundly important task. Professional players, especially the established hitters, spend hours searching through timber stacks in the storage yards of bat companies for just the right billets. The expert judgment of professional players regarding bat specifications has been acquired as a result of long and tedious hours of experimentation under practice and game conditions. The professional player knows that for the extremely important job of hitting he must supply himself with bats turned to meet his particular requirements. So important and delicate is the process of turning bats to the precise specifications of the professional athletes that bat manufacturers will reserve the right to deal directly with the players in organized baseball. The amateur player is not as privileged. He could use this personalized service to advantage.

Bats are made from northern white ash and wild pecan. Ash is taken from northern Pennsylvania and New York

As contrasted with actual length, the illustration indicates the variation of effective length with shape. For the purposes of this article, effective length is defined as the distance from the center of suspension, or axis of rotation, to the center of percussion.

state while pecan is found in Louisiana and Mississippi. Timber is specially selected, cut, transported, turned into billets, and stored in the stock yards for seasoning. The seasoning process for the round and square billets takes from nine to eighteen months. Billets are usually cut 40 inches long and are $2\frac{1}{2}$ to 3 inches in diameter. The maximum length for the official baseball bat is 42 inches and the maximum diameter is $2\frac{3}{4}$ inches. The majority of bats are made from white ash. Where special toughness and weight are needed, wild pecan, a heavier and stronger wood, is used.

Bat production by the major companies is geared to the requirements of the professional athlete. They have top priority on the choice woods. There are approximately six grades of timber used in the manufacture of bats. Since bats are not turned especially for the amateur player more care is needed in finding the bat best suited to the individual. Often limited budgets prevent the young player from getting the best. Lack of knowledge of what to look for in bats just as often places unnecessary restrictions on the athlete. As mentioned earlier, certain quality features are expected in first line bats. Top grade wood, seasoning, design and shape, finish, weight distribution, length, etc., are some of the important features which are sought.

Weight, length, and shape are features of major importance to the young athlete who is attempting to tailor bats to his needs. Before discussing these features, a basic premise is worth repeating. The ideal is to hit the baseball when desired and in a manner to impart desired speed, direction, and distance. Now, assuming contact with the base-

After graduating from Springfield College in 1940, Tom Johnson served in the special services branch of the army. He has been at Howard University since 1946 where he assists in football, is varsity swimming coach, and coaches the baseball team. One of Tom Johnson's colleagues, Halson Eagleson, of the physics department, assisted in the preparation of this material.

ball, what factors considering only ball and bat relationship, determine speed, direction, and distance?

Speed depends upon impulse delivered by the bat in collision with the ball. Direction depends upon two factors: (1) the point at which the ball makes contact on the bat and (2) the position of the bat in the swing when contact is made. Four factors seem to be important where distance is concerned: (1) the relative momenta of the bat and ball at instant of collision, (2) the elasticity, *liveliness* or the coefficient of restitution of the ball (the ability of the ball to withstand distortion upon collision and if distorted, the ability to regain its original shape, (3) the mass of the bat, and (4) the position on the bat where contact is made (relative to the center of percussion).

Another important premise is related to the discussion of weight, length, and shape of the baseball bat. The longer the hitter is able to look at the pitch before starting his swing, the less are his chances of being fooled by the pitch. Also, if the pitcher is faster and more skilled, the greater are the chances of the hitter being fooled. Thus it is very important to wait until the last split second before starting the swing. Waiting until the last split second requires

excellent judgment, fast hands, strength, speed, reaction time, and a bat tailored to the needs of the athlete. A bat one ounce too heavy would tend to disturb the delicate balance and timing required for hitting excellence.

For a given set of conditions it is obvious that it is more difficult to start a heavy mass from rest and accelerate it to a desired speed in a given time than a lighter mass. On the other hand, it would be necessary, all other conditions remaining constant, to accelerate the lighter mass to a greater maximum velocity in order to impart an impulse equal to that of the heavier mass. These conditions seem to be at the very heart of the argument over the heavy versus the light bat. It is argued that the average scholastic or collegiate player does not possess the strength, speed, and bat control to warrant his use of the light bat. To do so would be tantamount to encouraging the player to go for the long ball. The percentage, in the judgment of those favoring this school of thought, does not favor the hitter. Consequently, the hitters are encouraged to use the heavier bat and concentrate on getting the line singles. Still others just as enthusiastically debate the merits of the lighter bat. What are the real bases for the dichotomy? Does a basic difference exist?

To choose the heavy bat (36 to 40 ounces) as an all-purpose bat would seem to penalize the hitter. Certainly the fast ball pitcher is given an advantage. The pitcher with the fast breaking stuff has an advantage too. Assuming the hitter had the strength to handle the weight, the heavier bat seems to be the proper selection for

(Continued on page 55)

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Fourteenth Annual

Report on
High School Track

Meet Summary Appears on Pages 44 and 45

FOR the fourteenth consecutive year we present this report on track and field among the nation's secondary schools. In the first report and in each subsequent report, we have cautioned the reader against placing too much emphasis upon the point scores. There are too many variable factors to consider such as weather and climate to make these figures anything more than interesting statistics.

To add interest to the presentation of the results of the preceding spring's state track meets, points were awarded for the six best performances on a 10-8-6-4-2-1 basis. The best performance was indicated with a solid red block, and when two states tied as they did in the 100-yard dash diagonal blocks were used. In each case, a star indicates a new state record. The total number of points is indicated at the right-hand side of the chart in black, while the red figure in parenthesis indicates the finish order of those states scoring points.

California in First Place

Every year with the exception of two, California has been in first place. On those two occasions Texas occupied the top rung. On almost every other occasion Texas has been California's closest pursuer. A year ago California led Texas by $3\frac{1}{2}$ points and this year by $6\frac{1}{2}$.

Washington has been among the *top ten* on five previous occasions, but its point total of 42 and third place finish are new highs for this state.

Arizona moved up from seventh to fourth place and has now been among the elite on five occasions. New Jersey repeated its fifth place finish of a year

ago, and thus is among the leaders for the seventh time. New York returned to the select group after a year's absence and has now been accorded the honor eight times. Oregon dropped from third to seventh place, but this year marks the western state's fifth appearance high up on the list. Ohio, finishing in eighth place, has only missed once, while ninth place finisher, Illinois, returns to the list after a poor showing a year ago, and has now been among the ten leaders eleven times. Oklahoma, although holding a high ranking on the all-time list, has only been among the *top ten* once previously.

Over the fourteen years 24 states have appeared among the first ten indicated in the following table:

State	No. of Years
California	14
Texas	14
Ohio	13
Illinois	11
Pennsylvania	10
Indiana	9
New York	8
New Jersey	7
Kansas	6
Washington	6
Arizona	5
Oregon	5
Michigan	3
Missouri	3
Louisiana	3
Massachusetts	2
Oklahoma	2
Colorado	1
Connecticut	1
Florida	1
New Mexico	1
Tennessee	1
Utah	1
Virginia	1

There was no change among the first four on the all-time list. Texas increased its lead over third place Ohio by 51 points and now leads Ohio by 272 points. Five years ago Texas held a margin of only 109 points. However, Ohio continues to maintain its margin over fourth place Illinois. Last year Indiana and New York were tied for fifth place. For four consecutive years Indiana failed to register enough points to be among the *top ten* and hence has been overtaken by New York. New Jersey moved ahead of neighboring Pennsylvania. The three Middle Atlantic states now hold fifth, seventh, and eighth spots and have a combined average standing higher than any other section of the country.

Washington jumped from twelfth to ninth position and has moved up as many as five spaces over the past five years. The three states of Kansas, Oklahoma, and Iowa comprise the next three positions. Last year the latter two were tied, and Oklahoma scored one-half a point more to take over the eleventh spot. The next two states, Oregon and Arizona, continue in thirteenth and fourteenth positions, but strengthened their lead over fifteenth place Louisiana. Among the rest Utah moved up two spots to twenty-second place. A year ago Florida, Minnesota, and Nebraska were tied for twenty-fifth place. Minnesota outscored Florida, while Nebraska went scoreless to break the three-way tie. From thirty-fourth place down there was no change in position, because not one of the states ranked in those positions garnered any points.

The standings with all fractions rounded off to the nearest full number are shown in the following table. The numbers in parenthesis indicate the position five years ago and nine years ago.

State	Total	('55 rank)	('51 rank)
1. Calif.	1177	(1)	(1)
2. Texas	681	(2)	(2)
3. Ohio	409	(3)	(3)
4. Ill.	343	(4)	(4)
5. N. Y.	282	(6)	(7)
6. Ind.	273	(5)	(5)
7. N. J.	239	(7)	(9)
8. Penna.	238	(10)	(10)
9. Wash.	181	(14)	(15)
10. Kans.	177	(13)	(16)
11. Okla.	173	(9)	(14)
12. Iowa	172	(8)	(6)
13. Ore.	153	(11)	(13)
14. Ariz.	144	(18)	(23)
15. La.	127	(22)	(25)
16. Mo.	116	(16)	(11)
17. Mass.	110	(15)	(18)
18. Mich.	100	(19)	(20)

(Continued on page 47)



THE OFFICIAL STARTING BLOCK FOR:

● PENN RELAYS ● COMPTON INVITATIONAL ● DRAKE RELAYS ● TEXAS RELAYS ●
 KANSAS RELAYS ● MADISON SQUARE GARDEN NATIONAL CHAMPIONSHIPS ● FRESNO
 RELAYS ● MODESTO RELAYS ● LOS ANGELES COLISEUM ● I.C. 4-A INDOOR AND OUTDOOR
 ● CANADIAN PAN-AMERICAN AND OLYMPIC COMMITTEE TRIALS ● THIRD PAN-AMERICAN
 GAMES ● U.S.A.-U.S.S.R. . . . and most of the other great Meets in the U. S.

Arnett Starting Blocks

the blocks with which records are made

Event	Time	Place	Date	Event	Time	Place	Date
100-Yd. Dash	9.3	Fresno, Calif.	5/9/59	220-Yd. L.H.	22.2	Durham, N. C.	5/5/56
100-Yd. Dash	9.3	Fresno, Calif.	5/15/58	220-Yd. L.H.	22.3	Balt Lake City	6/21/47
100-Yd. Dash	9.3	Evansville, Ill.	5/15/58	400-Meter H.	49.5	Los Angeles	6/29/56
100-Yd. Dash	9.3	Fresno, Calif.	5/12/58	110-Meter H.	19.4	Bakersfield, Calif.	6/22/56
100-Yd. Dash	9.3	Durham, N. C.	5/5/56	800-Yd. Run	1:46.8	L. A. Relays	5/24/57
100-Yd. Dash	9.3	Texas Relays	4/8/57	2-M. Relay	7:22.7	L. A. Relays	5/24/57
100-Yd. Dash	9.4	Abilene, Tex.	4/27/57	880-Relay	1:22.7	Texas Relays	4/4/57
220-Yd. Dash	20.0	Sanger, Calif.	6/9/56	440-Relay	39.9	Kansas Relays	4/20/57
220-Yd. Dash	20.2	Los Angeles	5/7/49	440-Relay	39.9	W. C. Relays	5/11/57
440-Yd. Run	46.2	Salt Lake City	6/21/47	150-Meter Dash	19.3	U.S.A.-U.S.S.R.	7/16/59
440-Yd. Run	46.0	Berkeley, Calif.	6/5/48	100-Meter Dash	19.3	Pan. Am. Games	6/25/59
440-Yd. Run	45.8	Modesto, Calif.	5/29/56	200-Meter Dash	20.6	Pan. Am. Games	5/31/59
120-Yd. H.H.	13.5	Fresno, Calif.	5/15/59	200-Meter Dash	20.7	U.S.A.-U.S.S.R.	7/20/59
				400-Meter H.	39.9	U.S.A.-U.S.S.R.	7/26/59

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Track in the High Schools

STATE	120 HIGH	100 DASH	MILE	880 RELAY	440	180 LOWS	880	220 DASH	MILE RELAY	POLE	SHOT	HIGH	DISCUS	BROAD	JAVELIN (a)	TOTAL
ALA.	15.1	★ 9.9	4:36.0		50.4	★ 20.0	2:01.0	22.3	★ 3:25.7	11-6	49-6½	5-11¼	155-11	22-7¼		
ARIZ.	14.7	10.1	4:32.1	1:30.3	★ 48.6	19.6	1:59.7	22.2		13-7¼	55-10	★ 6-4¼	★ 10-7½	★ 23-5¼		24 (4)
ARK.	15.4	10.0	★ 4:33.1	1:32.9	50.5	20.1	2:01.8	22.4	3:32.3	12-1	49-7¼	6-0¼	150-8	21-0		
CALIF.	14.3	9.8	★ 4:11.0	1:22.0	★ 48.6	3¼ 19.2	1:53.2	21.6	3:19.8	13-8¼	57-8	★ 6-7¼	★ 176-1	★ 23-5¼		77½ (1)
COLO.	15.1	10.1	4:40.1	1:31.3	49.5	19.5	1:58.8	21.8	★ 3:27.6	12-2¼	53-11¼	6-1	145-4¼	21-9¼		
CONN.	★ 14.6	10.0	★ 4:23.4	1:31.5	50.0	19.6	★ 1:55.7	22.1		11-0	54-3¼	5-11¼	138-6¼	22-10¼	179-9¼	4 (22)
DEL.	No State Meet															
D. C.	★ 14.2	10.0	4:36.3	1:30.5	51.1	★ 20.1	★ 1:59.2	★ 22.2	3:31.0	10-4	49-9½	6-1	147-8	21-2		5 (20)
FLA.	14.8	10.0	4:35.2	★ 1:29.6	49.8	★ 20.0	★ 1:59.6	22.3	★ 3:25.9	13-0¼	54-2½	6-2	151-9¼	22-5¼		2¼ (26)
GA.	16.0	9.9	4:41.5		51.8	21.1	2:02.8	22.6	3:28.3		52-2¼	6-1	148-0¼	22-4¼	180-2	
HAWAII		10.2	4:44.5	1:32.7	54.0	21.6	2:11.8	23.3	3:46.6	12-0¼	55-11	5-6	132-9	21-5¼		
IDAH0	15.4	10.2	4:37.6	1:32.8	50.5	20.1	2:02.4	22.1	3:35.9	11-3	50-5	6-0	146-7	21-2½		
ILL.	14.9	10.0	4:26.2	1:31.9	49.5	19.9	★ 1:55.1	22.7	3:23.5	12-8	58-2	6-3	★ 172-3	22-10¼		14 (9)
IND.	14.6	10.1	★ 4:19.8	★ 1:30.6	49.2	20.2	1:59.0	21.8	3:25.6	13-0	54-7½	★ 6-6		22-3		12 (12)
IOWA	14.9	9.8	★ 4:21.1	1:30.1	50.0	19.9	1:57.8	21.7	3:26.0	12-6¼	★ 60-0¼	6-2	149-1	21-7½		13¼ (11)
KANS.	15.4	10.2	★ 4:19.1	1:32.1	52.0	20.5	1:56.4	22.7	3:26.1	13-1	55-7¼	6-0¼	156-10	22-10¼	★ 217-0	10 (14)
KY.	15.3	10.2	4:33.4	1:33.9	50.5	20.6	★ 1:58.4	22.8	★ 3:31.5	11-4½	51-5¼	5-11¼	141-5¼	21-6¼		
LA.	15.1	10.1	4:32.8	1:30.4	50.1	20.0	★ 1:56.6	21.5	★ 3:23.4	12-4	53-4	6-1¼	150-2	22-3¼	★ 214-4¼	8¼ (15)
MAINE	15.1	10.4	★ 4:26.3	1:35.3	50.4	★ 20.2	★ 2:00.4	22.8			★ 51-10¼	5-9	149-4	21-0	172-10¼	
MD.	★ 9.9		4:39.6	★ 1:31.4	51.9	20.4	2:00.7	22.5	★ 3:30.9	11-9	48-10¼	5-9	★ 161-0	★ 22-0¼		
MASS.	15.4	10.2	4:29.6	1:31.4	50.0	20.1	2:01.7	21.9			51-4	6-0¼	137-1	★ 23-8	174-11	8 (16)
MICH.	★ 14.4	10.2	4:29.2	1:32.0	50.8	3¼ 19.2	1:59.3	21.6		★ 13-3	55-3	6-1		22-8		5¼ (19)
MO.	★ 14.5	10.0	4:29.5	1:31.2	49.7	19.6	1:58.5	22.0	3:26.4		55-6	6-1¼	155-2½	22-2¼		
MONT.	15.5	10.1	4:32.4	1:32.5	50.2	20.5	2:00.3	21.8		12-2¼	54-9¼	★ 6-6	155-0¼	22-3	187-6	6 (18)

NICH.	★	14.4	10.2	4:29.2	1:32.0	50.8	19.2	1:59.3	21.6	★	13.3	55.3	6.1	22.8	514 (19)
MO.	★	14.5	10.0	4:29.5	1:31.2	49.7	19.6	1:58.5	22.0	3:26.4		55.6	6-1½	155-2½	22-2½
MONT.		15.5	10.1	4:32.4	1:32.5	50.2	20.5	2:00.3	21.8		12-2½	54-9¾	★ 6-6	155-0½	22-3 187-6 6 (18)
NEBR.	★	14.6	10.0	4:33.9	1:31.9	49.2	19.6	2:00.5	22.3	3:28.7	★	52-11	6-1	148-8½	22-1
NEV.		15.3	10.2	4:44.3	1:34.2	51.7	20.4	2:10.4	22.3			★ 55-3¾	★ 6-2	141-7	22-2
N. H.		15.7	10.4	4:35.8	★ 1:34.8	53.2	★ 20.9	2:03.5	22.3			49-9¼	5-11½	137-4	20-4½ 179-10
N. J.	5	14.2	10.0	4:23.5		49.7	19.5	1:57.0	21.5		12-6	60-10½	6-1	174-0½	23-0¼ 207-3 22¼ (5)
N. MEX.		15.0	10.2	4:42.8	1:29.6	★ 49.0	20.1	2:00.6	22.0	3:27.7	12-5¼	★ 55-4¼	6-1	140-10	★ 23-5¼ 189-3 3¼ (25)
N. Y.		15.1	10.0	4:23.2	1:31.1	★ 48.4	19.8	1:57.9	21.7	★ 3:45.0	12-7¼	★ 58-4¼	6-0	161-5	22-3¼ 21 (6)
N. C.		15.8	10.2	★ 4:25.0		52.1	20.9	2:00.5	22.0	3:34.1	★ 12-4¼	49-8¾	★ 6-0½	139-7	21-2¾
N. D.		15.5	10.2	4:34.4	★ 1:33.8	51.8	20.6	2:02.5	23.2	3:32.2	11-1	52-3½	5-10½	139-0	21-4½ 178-6½
OHIO		14.5	9.9	4:29.0	1:29.6	49.7	19.2	1:59.2	21.7	★ 3:24.1	12-8	57-11½	6-4	174-8½	23-6½ 20-½ (8)
OKLA.		14.7	10.0	4:31.2	1:30.0	★ 49.9	19.5	2:00.1	21.5	3:24.1	12-10	★ 55-11½	6-0¼	153-4	22-1 13¼ (10)
ORE.		14.8	10.0	★ 4:21.2	★ 1:29.4	50.9	★ 19.2	1:57.7	22.1		12-4	55-9¼	6-1½	162-11	22-10¼ 220-3¼ 20¼ (7)
PA.		14.5	10.0	4:27.6	1:30.6	49.5	20.0	★ 1:55.6	21.7	3:23.4	12-6	57-4	6-2½	★ 168-1	22-0 204-9½ 12 (12)
R. I.		15.1	10.3	4:38.6		51.0	20.8	2:02.4	22.9		11-3	54-9¾	5-11¼		21-6 178-3
S. C.		15.9	10.3	4:49.3	1:34.5	52.2	21.6	2:03.7	22.7	★ 3:34.0	★ 12-4¼	47-10¼	5-11	★ 155-6	21-5
S. D.		15.3	10.4	4:32.8	★ 1:31.3	50.1	20.1	1:59.4	22.1	★ 3:25.7	★ 12-10½	51-7½	6-0	155-8	20-5
TENN.	★	14.5	10.0	4:39.6	1:33.2	51.2	20.3	2:01.1	22.2	★ 3:29.6	★ 12-7	51-8	5-11¼	148-3	21-2¼
TEXAS		14.2	9.7	4:27.2		48.7	18.7	1:57.4	20.9	★ 3:18.0	★ 13-5½	58-5½	★ 6-6	167-3½	71 (2)
UTAH		15.2	★ 9.8	4:38.1	★ 1:30.7	51.2	★ 19.7	2:03.6	21.5	3:31.0	12-0	56-8½	6-3	162-4½	22-7 190-4 6½ (17)
VT.		15.5	10.5	★ 4:30.2		53.0	21.3	2:04.8	23.0		11-3	48-4¾	5-9½	134-6	20-11¼ 166-6
VA.		15.0	10.2	4:29.9	1:34.7	50.2	20.0	1:58.5	22.5	3:30.5	12-0	53-8	6-0¼	153-8	21-9¼
WASH.	★	14.4	9.9	4:31.4	★ 1:29.2	★ 48.5	★ 19.0	★ 1:55.9	★ 21.2		★ 12-1	56-0¼	6-3¼	161-5	23-0¼ 211-7 42 (3)
W. VA.		15.2	★ 9.8	4:34.9	1:32.4	★ 49.5	20.4	2:00.5	22.1	3:29.8	11-7	★ 52-7	5-9	139-2	22-1¼ 3¼ (24)
WISC.		14.2	10.0	4:30.2	1:32.2	50.5	★ 19.6	2:00.0	22.3			53-11½	6-1½	163-0	22-1¼ 5 (20)
WYO.		14.9	10.1	4:38.3	1:36.2	52.5	20.7	2:04.2	23.2	3:36.9		51-9	★ 6-2¾	144-2	21-0

(a) No points awarded for javelin because less than half the states have this event.

National Honor Roll

Competitor and School	Meet	Time	San Romani (East, Wichita, Kans.)	Hutchinson Inv.	4:13.6
100-Yard Dash					
Howard (San Bernardino, Calif.)	So. Section Prelims.	9.6	Hibler (Concordia, Fort Wayne, Ind.)	State	4:19.8
Spodris (Hudson, N. Y.)	Hudson Relays	9.6	Nelson (Faribault, Minn.)	State	4:19.9
Fitzgerald (California, Whittier, Calif.)	Chaffey Inv.	9.7	Chapman (Huntington, N.Y.)	Eastern States Meet	4:21.0
Glosson (Highlands, San Antonio, Texas)	San Antonio Inv.	9.7	Trimble (Jefferson, Cedar Rapids, Iowa)	State	4:21.1
Green (Richland Springs, Texas)	Rochelle Relays	9.7	Abram (Grant, Portland, Ore.)	State	4:21.2
Kemp (Carter-Riverside, Fort Worth, Texas)	State	9.7	Riesinger (Rogers, Tulsa, Okla.)	Okla. Six Conference	4:21.6
Lasater (Big Spring, Texas)	District	9.7	Schubel (East, Duluth, Minn.)	State	4:21.7
Leath (Huntington, L. I., N.Y.)	Sectional	9.7	Thomas (Uniontown, Penna.)	District	4:22.6
Mannings (Bakersfield, Calif.)	Central Sec. Finals	9.7	120-Yard High Hurdles		
McCloud (Polytechnic, Long Beach, Calif.)	Moore League Finals	9.7	Pauly (Beaverton, Ore.)	State	13.8
Mitchell (Gainesville, Texas)	State	9.7	Cawley (Farmington, Mich.)	Regional	13.9
Proffitt (Muir, Pasadena, Calif.)	So. Section Finals	9.7	Andrews (Polytechnic, Long Beach, Calif.)	So. Counties Inv.	14.1
Richardson (Nocona, Texas)	Possom-Kingdom	9.7	Johnson (Abilene, Texas)	District	14.1
Swift (La Habra, Calif.)	So. Section Prelims.	9.7	Moore (Cardozo, Washington, D. C.)	State	14.2
Watson (Jordan, Los Angeles, Calif.)	State Prelims.	9.7	Pierce (Burbank, Calif.)	State Prelims.	14.2
220-Yard Dash					
Rhodes (Hoover, Glendale, Calif.)	So. Counties Inv.	20.8	Jansen (Kimberly, Wisc.)	State	14.3
Kemp (Carter-Riverside, Fort Worth, Texas)	State	20.9	Poage (Lamar, Houston, Texas)	Pasadena Relays	14.3
Brown (Texarkana, Ark.)	Arkansas Relays	21.0	Darone (Pittsburg, Calif.)	West Coast Relays	14.4
Crystal (Coachella, Calif.)	Chaffey Inv.	21.0	Rhodes (Rogers, Spokane, Wash.)	State	14.4
Moore (La Habra, Calif.)	So. Counties Inv.	21.0	180-Yard Low Hurdles		
Enz (Antioch, Calif.)	Davis Picnic Inv.	21.1	Mitchell (Gainesville, Texas)	State	18.7
Haas (Morningaside, Inglewood, Calif.)	So. Section Prelims.	21.1	Andrews (Polytechnic, Long Beach, Calif.)	So. Section Finals	18.9
Mitchell (Gainesville, Texas)	State	21.1	Weldon (Galena Park, Texas)	District	18.9
Buckner, Hudson's Bay, Vancouver, Wash.)	State	21.2	Rhodes (Rogers, Spokane, Wash.)	State	19.0
Etherly (Albuquerque, New Mex.)	District	21.2	Smith (Taylor, Texas)	Pasadena Relays	19.0
Green (Richland Springs, Texas)	State	21.2	Farmer (Miramonte, Orinda, Calif.)	State Prelims.	19.1
Howard (San Bernardino, Calif.)	State	21.2	Woolever (Snyder, Texas)	Regional	19.1
Nelson (Andrews, Texas)	Regional	21.2	Broussard (Pasadena, Texas)	District	19.2
440-Yard Dash					
Stoddart (Marshall, Oklahoma City, Okla.)	State	47.9	Carroll (Santa Ana, Calif.)	Sunset League	19.2
Clarke (Sewanhaka, Floral Park, N. Y.)	Sectional	48.4	Hankins (Fullerton, Calif.)	So. Section Semi-Finals	19.2
Emanuel (Bellevue, Wash.)	State	48.5	Larimer (Genoa, Ohio)	State	19.2
Barrick (Phoenix, Ariz.)	State	48.6	Mullican (Sunset, Dallas, Texas)	East Texas Relays	19.2
Farmer (Miramonte, Orinda, Calif.)	State	48.6	Orr (Manual Arts, Los Angeles, Calif.)	City	19.2
Holley (Carter-Riverside, Fort Worth, Texas)	State	48.7	Renfro (Jefferson, Portland, Ore.)	State	19.2
Comer (Reseda, Calif.)	Valley Finals	48.8	Smith (Taylor, Texas)	State	19.2
Carroll (Albuquerque, New Mex.)	White Sands Relays	48.9	Field Events		
Haas (Morningaside, Inglewood, Calif.)	Pioneer League	48.9	Pole Vault		
880-Yard Run					
Dunbar (Westmoor, Daly City, Calif.)	State	1:53.2	Cramer (Mt. Vernon, Wash.)	State	14-1½
Davis (Polytechnic, Long Beach, Calif.)	So. Section Semi-Finals	1:53.4	Rose (Hoover, Glendale, Calif.)	So. Section Semi-Finals	14.0
San Romani (East, Wichita, Kans.)	Baker Relays	1:54.4	Looney (Santa Barbara, Calif.)	State	13-8¾
Dunn (Chula Vista, Calif.)	So. Section Finals	1:54.7	Armon (West, Phoenix, Ariz.)	State	13-7¾
Morgan (Phillips, Chicago, Ill.)	State	1:55.1	Buchanan (San Marino, Calif.)	Rio Hondo Prelims.	13-6¼
Wood (Fresno, Calif.)	Central Section	1:55.2	Stitzer (Santa Monica, Calif.)	So. Section Semi-Finals	13.6
Canova (Bellflower, Calif.)	So. Section Semi-Finals	1:55.3	Howe (Escondido, Calif.)	State	13-5¾
Rawson (Lake Forest, Ill.)	District	1:55.4	Hansen (Cuero, Texas)	State	13-5½
Riesinger (Rogers, Tulsa, Okla.)	Tulsa City	1:55.8	Alcorn (Birmingham, Mich.)	State	13-3
Pratt (Wenatchee, Wash.)	State	1:55.9	Morrow (Montgomery, Minn.)	State Regional	13-3
Mile Run					
Story (Orange, Calif.)	State	4:11.0	High Jump		
			Stuber (Bellflower, Calif.)	San Gabriel League	6-8
			Faust (Culver City, Calif.)	So. Section Prelims.	6-7¾
			Upton (Vernon, Texas)	Regional	6-7
			Nickleberry (Oxnard, Calif.)	State	6-6¾
			Hoppe (Broadwater Co., Townsend, Mont.)	State	6-6
			Williams (Shortridge, Indianapolis, Ind.)	State	6-6
			Hutchinson (New Albany, Ind.)	S.I.A. Conference	6-5¾
			Miller (Twin Bridges, Mont.)	State	6-5

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Haas (Ray, Corpus Christi, Texas)	State	6-4½
Mertes (Canoga Park, Calif.)	Valley League	6-4½
Broad Jump		
Haas (Ray, Corpus Christi, Texas)	State	25-1¾
Tripp (Crawford, San Diego, Calif.)	So. Section Finals	24-0
Andrews (Polytechnic, Long Beach, Calif.)	So. Section Finals	24-2½
Howard (San Bernardino, Calif.)	So. Section Prelims.	24-2½
Miller (Winters, Texas)	Red Raider Relays	24-2
Lorick (Fremont, Los Angeles, Calif.)	City Finals	24-0¾
Tucker (Lincoln, San Diego, Calif.)	So. Section Finals	24-0¾
Hansen (Cuero, Texas)	State	23-11¾
Jones (Midland, Texas)	Red Raider Relays	23-11
Jones (Delano, Calif.)	So. Yosemite League	23-8¾
Springer (Abilene, Texas)	Red Raider Relays	23-8½
Lewis (Springfield Tech., Springfield, Mass.)	Western	23-8

Shot Put

Rosdahl (Ridgefield Park, N. J.)	State	60-10¾
Carlson (Dubuque, Iowa)	State	60-0½
Kamp (Fort Madison, Iowa)	State	59-11½
Barbizzi (Bloom Twp., Chicago Heights, Ill.)	District	59-7¾
Martindale (San Angelo, Texas)	Dallas Inv.	59-6
Phillips (Brazosport, Freeport, Texas)	Pasadena Relays	58-11
Merritt (Jordan, Long Beach, Calif.)	So. Section Semi-Finals	58-5½
Valle (Yorktown, N. Y.)	State	58-4¾
Middleton (Harding, Marion, Ohio)	State	57-11¾
Parker (Turlock, Calif.)	State	57-8

Discus Throw

Johnston (No. Phoenix, Phoenix, Ariz.)	Luke Greenway Inv.	194-5
Middleton (Harding, Marion, Ohio)	Wesleyan Relays	184-6
Johnson (Tascosa, Amarillo, Texas)	Canyon Reef Relays	181-8½
Martindale (San Angelo, Texas)	San Angelo Relays	179-11
Snidow (San Rafael, Calif.)	State	176-1
Rosdahl (Ridgefield Park, N. J.)	State	174-0½
Giesey (Midland, Texas)	Canyon Reef Relays	173-6½
Schoenwetter, Fremont, Sunnyvale, Calif.)	State	173-0
Webb (E. St. Louis, Ill.)	District	172-7
Darnes (Polytechnic, San Francisco, Calif.)	West Coast Relays	168-7

Faggart (Porterville, Calif.)	State	168-1½
Linhart (Penn Hills, Penna.)	State	168-1
Javelin Throw		
Winningham (Grants Pass, Ore.)	Hayward Relays	225-6¼
Talbott (McPherson, Kans.)	State	217-0
Red (Lafayette, La.)	State	214-4½
Sager (Ferndale, Wash.)	State	211-7
Studney (Hillside, N. J.)	State	207-8
Reynolds (Interboro, Penna.)	District	206-9
Wagner (Hummelstown, Penna.)	State	204-9½
Miller (Lancaster, Penna.)	District	198-2½
Otero (Las Lunas, New Mex.)	District	196-8
Hoskinson (Hugoton, Kans.)	Sterling Relays	196-7

880-Yard Relay

Fremont, Los Angeles, Calif.	State Trials	1:27.2
Polytechnic, Long Beach, Calif.	State Prelims.	1:27.4
Bakersfield, Calif.	Fresno Relay Carnival	1:28.3
Delano, Calif.	West Coast Relays	1:28.6
Compton, Calif.	So. Section Semi-Finals	1:28.8
Albuquerque, New Mex.	Albuquerque Relays	1:29.0
Garfield, Seattle, Wash.	State	1:29.2
East Tech., Cleveland, Ohio	State Prelims.	1:29.3

Mile Relay

Lamar, Houston, Texas	Regional	3:18.5
Carter-Riverside, Fort Worth, Texas	State	3:18.6
Lee, Baytown, Texas	Regional	3:19.0
Jefferson, Los Angeles, Calif.	State	3:19.8
Abilene, Texas	District	3:20.7
Byrd, Shreveport, La.	Meet of Champions	3:20.7
Midland, Texas	District	3:21.2
Andrews, Texas	Red Raider Relays	3:21.4
East Tech., Cleveland, Ohio	State Prelims.	3:23.6
Roosevelt, Dayton, Ohio	State Prelims.	3:23.7

440-Yard Relay

Jefferson, Dallas, Texas	State	42.4
Bakersfield, Calif.	Fresno Relay Carnival	42.5
Andrews, Texas	State	42.7
Carter-Riverside, Fort Worth, Texas	Dal-Hi Relays	42.7
Highland Park, San Antonio, Texas	Regional Prelims.	42.7
Bowie, Texas	State	42.8
Carlsbad, New Mex.	State	42.9
Midland, Texas	Regional	42.9
North, Des Moines, Iowa	State	42.9

Mile Sprint Medley Relay

Jefferson, Cedar Rapids, Iowa	State	3:31.5
Sioux Falls, South Dak.	State	3:40.2
Wauwatosa, Wisc.	State	3:40.7
Shawnee-Mission, Merriam, Kans.	State	3:41.8
Upton, Wyo.	State	3:48.8
South Fremont, Idaho	State	3:50.0

19. Wisc.	91	(12)	(8)
20. Colo.	80	(17)	(12)
21. Conn.	66	(20)	(19)
22. Utah	52	(27)	(23)
23. Va.	51	(21)	(17)
24. N. Mex.	49	(32)	
25. Minn.	43	(24)	(26)
26. Fla.	41	(23)	(31)
27. Nebr.	39	(25)	(21)
28. N. Dak.	30	(30)	(30)
29. Mont.	25	(26)	(28)
30. D. C.	23		(28)
31. Ida.	20	(28)	(22)
32. W. Va.	18	(33)	(29)
33. Tenn.	15	(28)	
34. Ark.	9		
35. Md.	9		
36. Ky.	8	(31)	(26)
37. N. Car.	8		
38. Nev.	7		

39. R. I.	6		
40. Ga.	5	(35)	(34)
41. S. Dak.	5	(33)	(32)
42. Ala.	4	(36)	
43. Miss.	1	(37)	(33)
44. Wyo.	½	(38)	

Sectional Averages

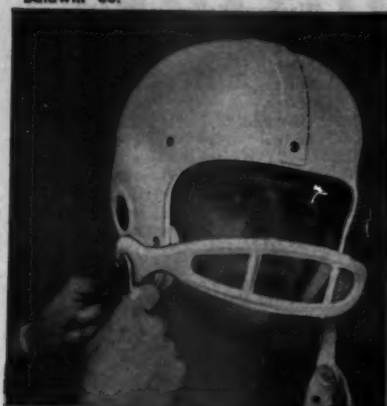
In writing up the second annual report we said: "The country was divided into nine sections for a further comparison." Each year since then we have "looked" at the report from a sectional viewpoint. Even though Hawaii was added to the Pacific section and failed to score, that region won by a comfortable margin. Without Hawaii the Pacific region's sectional average would have been an all-time high. The averages of

the first ten years, the 1957 and 1958 averages, and last year's averages are shown, in addition to those for the current study.

	'47-'56	'56-'57	'57-'58	1959	1960
Pacific	33.6	40.3	42.0	34.9	
West So. Cent.	20.5	16.8	27.2	23.2	
Mid. Atlantic	17.6	17.1	15.6	18.4	
East No. Cent.	19.1	16.5	09.2	11.2	
Mountain	02.8	03.4	06.9	04.9	
West No. Cent.	05.9	06.8	05.0	03.9	
New England	03.0	03.4	01.3	02.0	
South Atlantic	01.5	02.5	00.7	01.3	
East So. Cent.	00.8	00.0	00.0	00.0	

With the exception of the first year of the study in which sectional averages were considered, the Pacific region has finished first. The one ex-

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ception was one year when the East North Central region led the parade. The Middle Atlantic section has finished in the runner-up spot on five occasions, while the West South Central region has been second four times. The East North Central section, in addition to its one win, has been second three times. By the way, the East North Central section continues to lose ground although its performances were slightly above those of a year ago.

As will be noticed, four sections of the country practically dominate the high school track program. While there may be year-to-year fluctuations, the four sections, Pacific, West South Central, Middle Atlantic, and East North Central account for about four-fifths of all the points registered. During the first five years the 14 states comprising these sections accounted for 85 per cent of the total points. The second five-year period saw this figure increase to 88 per cent. The 1957 study showed 83.6 per cent, while for the next two years the figure dropped to 74.4 per cent (1958) and 74.7 per cent (1959). However, the present study shows the figure again near 80 per cent—79 per cent to be specific.

Previously, we pointed out the manner in which the East North Central region is falling behind the Middle Atlantic and West South Central sections. The same might be said of the West North Central region in relation to the mountain states. This fact is even more amazing considering that four of the seven states comprising the West North Central region are among the first 20 on the all-time list. On the other hand, only two of the eight mountain states can be found ranked that high. Arizona has been the standard-bearer for the mountain states, and earned almost as many points as the entire West North Central section. Arizona's rapid rise as a high school track power can be shown by its rise from twenty-third place on the all-time list in 1951 to eighteenth place on the 1955 list, and currently to a strong fourteenth place. The greatest improvement position-wise belongs to Louisiana, going from twenty-fifth to fifteenth place.

The steadiness of the three Middle Atlantic states not only is reflected in the sectional averages, but is shown in the steady improvement of the three states comprising this section. Pennsylvania has gone from tenth to eighth place on the all-time list, while New Jersey has improved from ninth to seventh and New York from seventh to fifth place.

Performances

In the write-up a year ago, we re-

ported that 150 records had been set in the 1958 state meets. Last year's state meets produced only 115 new marks, but in case anyone thinks last year was an off year, we would like to point out that the 115 new marks are exceeded only by the 150 mentioned, and the 116 broken in the 1957 meets. It is interesting to note that of the 77 track records only seven were in the 100- and 200-yard dashes, while better than 27 per cent of the new records were set in the two longer events, the mile and the half-mile.

The running events continue to increase as the source of new records. In the 1957 state meets, 44 per cent of the new records were made in the field events. This figure had dropped to 37 per cent for the 1958 meets, and the 1959 meets showed an even further reduction to 33 per cent. All of these figures concerning records do not include the javelin because only 17 states include this event in their state meets.

While the number of records did not compare with last year, the performances were equal to those of a year ago, thus indicating a general improvement.

The following table compares the average winning performances for the ten-year period 1947-'56 with that of a year ago as well as the current performances.

Event	'47-'56	1959	1960
120 H.H.	15.28	14.97	14.95
100	10.17	10.03	10.07
Mile	4:38.11	4:31.74	4:31.83
880 Ry.	1:36.64	1:31.85	1:31.75
440-Yd.	51.86	50.26	49.41
180 L.H.	20.17*	20.05	20.10
880-Yd.	2:02.20	2:00.41	2:00.20
220-Yd.	22.50	22.13	22.17
Mile Ry.	3:29.74**	3:29.29	3:29.32
Pole	11-6 1/4	12-3	12-3
Shot	49-6	53-9	53-9
H. J.	5-10	6-1 1/2	6-0 1/2
Discus	142-8 1/2	152-7	152-8
B. J.	21-5	21-8	22-1

* and **. Only recently have been included in state meets so the records show just the 1957-1958 averages.

It will be noticed that of the 14 events considered, six were better than a year ago, while two were the same, and six were poorer than in 1959. Notable improvements were shown in both the 440-yard run and the broad jump yet both of these events ranked rather low in the number of new records established. There were eight for the 440 and only five for the broad jump.

Another way to point out the terrific improvement being made in high school track performances is to compare this report with that of five years ago. One way of doing so is to show how this

(Continued on page 58)

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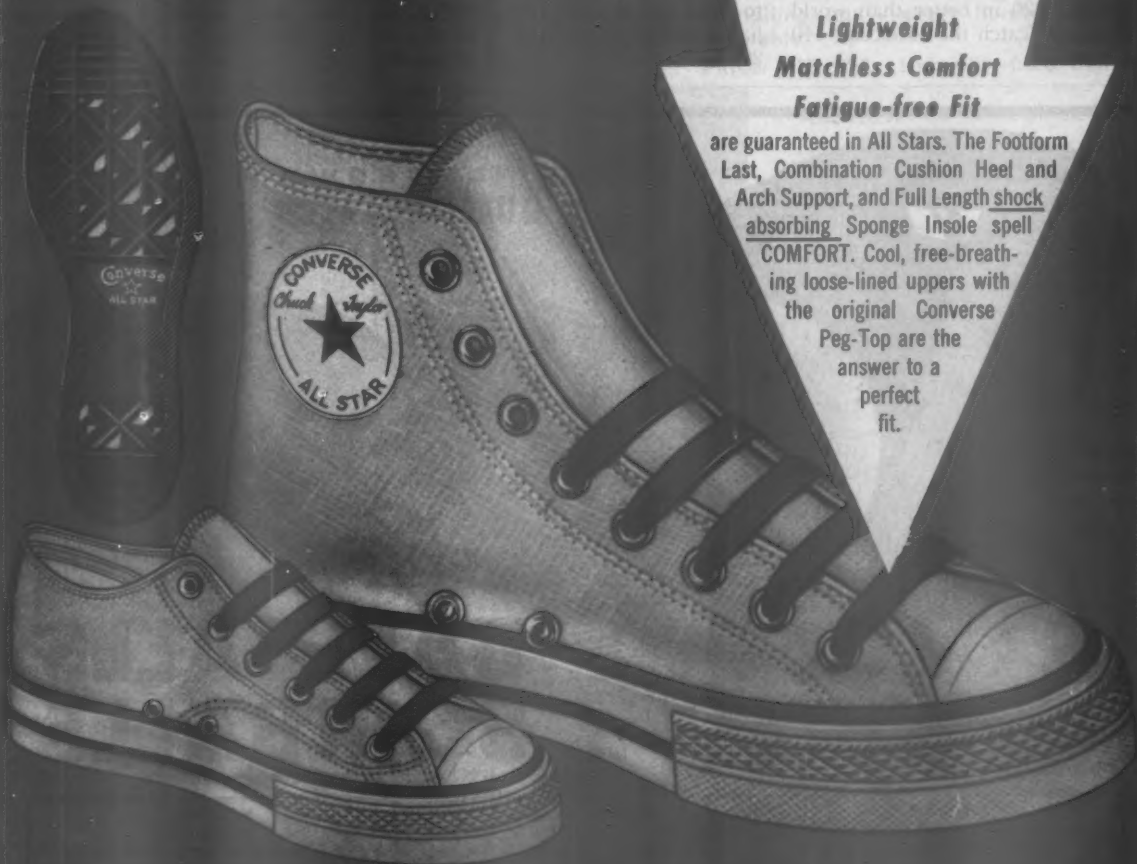
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Pace and Position

(Continued from page 32)


it must be accelerated, some very revealing possibilities might be involved. Let us begin with consideration of the 440-yard run. At first glance one might think that a high school runner who ran his first 220 at the rate of eight yards per second and finished the second 220 at the same pace would be tied by a boy who held off the pace in the first 220 and ran only six yards per second, but then finished with a rush, running the last 220 at ten yards per second. The leader at the eight-yard-per-second pace would run each 220 in 27½ seconds for a 55-second quarter mile. However, the second boy, although he would seem to offset the steady eight-yard-per-second pace by a six-yard-per-second first half followed by a ten-yard-per-second second half, would not do so at all. It can be proved mathematically that the second boy, despite a 22-second last 220 would have lost so much in the first 220 that he would finish with a 440 of well over 58 seconds. Indeed were he to run the first 220 at such a foolish pace, he would have to run the last 220 in better than world record time to catch the 55-second 440 man.

We know it is unlikely that a quarter-miler who has the speed necessary to run a 22-second 220 would ever be foolish enough to trot through a 36-second first 220. The extreme case is used merely to illustrate the burden that a man shoulders if he falls too far off even a moderate pace.

What has been demonstrated in this extreme case had equal importance in principle when applied to a more normal situation which is found in the average high school meet. Team A has a 440 man who likes to go to the front immediately and carry the field through a reasonably fast opening 220. Assume that he hits his 220 in 24.5 seconds and then drops off to a 27.5 last 220 to hit 52 seconds for his quarter. Team B has a man who likes to ease through the first 220 and come with a rush in the final 220. If he were to run his opening half of the race in 27.5, we might assume that he could then catch the team A runner by doing a 24.5 220 to finish. But what we must realize is that when he has allowed the team A man to open up the three-second gap, he has actually given him a lead of over 20 yards and then has no alternative

but to run that last 220 in 24.5 if he wants to catch his opponent at the tape. Any delay, even in the first 10 yards of the last 220, will mean that he will fail to cut down the team A man even if that man falls off to a 27.5 in the last 220. The fact remains that team A's man has covered his first 220 at nine yards per second as opposed to team B's man's eight yards per second. If the team B man delays acceleration for a single second, he will have to do better than 24.5 in his final 220 to win.

At this point we will not consider an extreme case such as the first one described. In high school meets, it is not uncommon to see a 52-second quarter-miler allow a rival who can also hit 52 build up a long first 220 lead. Another factor which must be recognized in this situation is that the boy in front has managed to get himself clear of the pack and can run without obstruction at the pace he has planned. On the other hand, the team B man has more than the problem of correct acceleration to bother him. He is quite likely to find himself ready to move at the same time that others in the race are about to move. If he encounters any jostling at all it impedes him, his task becomes even more critical, and his chances of catching the boy in front are gone unless he goes below 24 seconds for his



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second 220. It may be wise to recall that high school quarter-milers who are able to run one 220 around a curve in 23 seconds are not found in every race. Therefore, it would seem that the average high school runner whose quarter mile is run in about 51 or 52 seconds will be making a serious mistake if he allows any rival who has similar ability a lead of more than a second at the 220 mark. We are assuming, of course, that the rival runner does not make an equally serious error of running a first 220 under 24 seconds and thus be apt to end rubber-legged in the final 50 yards. We feel that as the quality of the runners improves, the more urgent it is to heed the dangers of permitting a long early lead. When the runners are capable of running under 50 seconds for the distance, the trailing man is faced with an almost impossible task if he permits his talented rival more than a second's lead at the halfway point.

When runners move up to the longer distances, the margin of lead permissible is greater, but not to the extent that is commonly supposed. It must be remembered that a man covering 10 yards per second is doing the 100 in 10 seconds flat. It must also be remembered that even though he is not slowed by the mechanics of starting, he must still be quite a sprinter to carry this pace for any appreciable distance. If the man is running nine yards per second, he is going to run a 440 in about 47 seconds. What this means in terms of pace in an 880 is that a pace of eight yards per second will give a boy a finishing time of 1:50 for his half mile. Obviously, any half-miler who hopes to challenge a runner with these capabilities would find himself in serious difficulty if he were to allow the leader as much as a two-second margin in the first quarter. By giving the leader a two-second lead he would be giving up about 17 yards, and regardless of any other factors such as jostling of opponents, rate of acceleration from his own pace to that needed to overtake his opponent, etc., the trailing man would have to run a 53-second last quarter to tie the time of his rival. He would have to better 53 seconds to win the race. It might be mentioned that this speed would have to be maintained without interference from such tactical errors as running too wide or passing opponents. The man's ability to run a 53-second last quarter in the half mile would not assure him of even a tie unless he made no mistakes.

Perhaps the most common error made by inexperienced runners who have fallen dangerously off the pace in the opening half of a race is that of trying to close the gap in one sudden burst of speed instead of in a steady acceleration which will bring the man up to his opponent's shoulder in time

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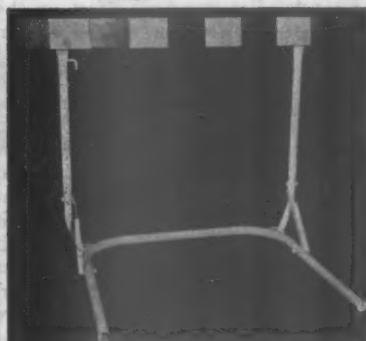
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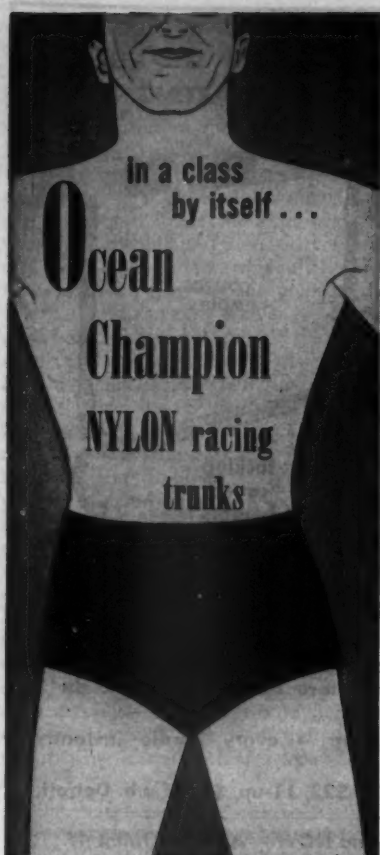
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to make an all-out bid as they approach the tape. Extremely important to the runner who trails in such a race is the knowledge of how far his opponent can sustain his pace and then take his final sprint at the close of his race. It is also vitally important to him to know the point at which his rival likes to start his final drive for the finish. The knowledge of his opponent's ability to sustain the pace he is setting along with the knowledge of the point at which he likes to start his sprint for the tape can be very helpful to the trailer who wants to upset his rival's tactics by jumping him just before the rival reaches the point of his usual move. Forcing him to carry a sprint farther than he likes can be upsetting to the rival and may spoil his pace.

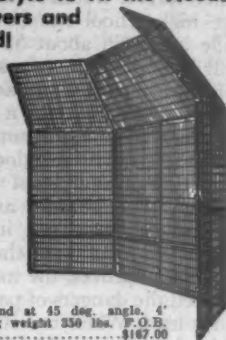
Many track coaches feel that the man who accelerates from behind wins. In recalling dozens of race finishes, we would be inclined to agree. There is both merit and danger in these racing tactics. We are sure that most of us can count on very few fingers the number of times we have seen runners win races by spectacular bids from far back. The majority of wins have been registered by runners who have been only a few yards back and have advanced swiftly in the final stages of the race. Many a time the crowd has been brought to its feet as the result of tremendous effort on the part of a trailing runner, only to see him close all but a few yards of the long gap. Even when he is running close to the leader, a trailing runner must consider other aspects of his position. Too many runners tend to hang on the heels of the leader and run directly behind him close to the pole. When other runners are closing in from the rear, this mistake can be fatal. The trailer would be far wiser to move out to a point just back of the right shoulder of the leader. This position would enable him to move away from a threat of a box as the others move up. It would also permit him to strike suddenly and without the possibility of interference when he was ready.

What has been pointed out here about the pace and position in the middle distance races applies also to the mile, two mile, and even longer races. How much a runner should fall off the pace should be governed not by any set yardage, but rather by the pace that the leader is carrying, the ability of the trailing runner, and most important of all by the demands that the trailer will have to meet in the last half of the race. When we have learned to stress limitations in pace and position more carefully, we will see fewer runners defeated by others who ran slower times than the potential of those who lost. The only alternative seems to be for a runner to get out front and stay there.

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Track Injuries

(Continued from page 26)

heel of the jumper's shoe. This vinyl cushion may also be taped to the heel. Rubber sponge does not seem to offer adequate protection.

2. Use the famous Michigan Heel Cup devised by Jim Hunt, trainer at the University of Michigan. This personally fitted fiberglass cup will not only prevent bruising, but will sometimes make it possible for the athlete to continue performing even after the injury occurs.

Treatment of a bone bruise involves rest and the avoidance of further irritation to the injured area. Infra-red heat and the whirlpool bath may help speed healing.

Arches. The arches of the feet may be injured by wearing ill-fitting shoes, landing on the sharp edge of the broad jump board or by stepping on stones or cinders while running. Elimination of these hazards will go a long way toward decreasing injuries to the arch. Since ill-fitting shoes cause most of the trouble, proper fitting is absolutely necessary. Too short or too narrow shoes will cause the bones of the arches to crowd together when the runner places his weight on his feet. At first the crowding may not cause obvious difficulty, but if the situation is allowed to go uncorrected for any length of time, permanent damage may result.

After the extent of injury to the arch is determined, proper treatment can be administered. If the arch causes extreme pain when the athlete runs or walks, complete abstinence from running is advocated until proper treatment is given. The foot should be taped for support and crutches or a cane should be used in walking. If the injury is a minor one, a metatarsal pad may be worn or a special arch support can be inserted in the shoe or taped to the foot. Sometimes simple taping will suffice. The runner will often have to determine what type of taping or support gives the most relief.

Lower Leg

Shin Splints. It is our opinion that the shin splint problem is caused by a specific muscle-strain type of injury. In running, the driving force at the finish of the stride is accomplished by a vigorous extension of the foot and final flexion of the toes. The posterior muscles of the lower leg furnish the power for this vigorous foot extension. In this group, the soleus and/or the tibialis posterior appear to be the muscles affected in shin splints.

The cause of shin splints is undoubtedly

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ly overwork, especially at the beginning of the season before the lower leg muscles have adapted themselves. Running on hard surfaces, a banked track or a change from a hard surface to a soft one may also be contributing factors.

Prevention of this painful and sometimes crippling condition should be of primary concern to the coach and runner. If the athlete waits until two or three weeks before the season to *get into shape*, he runs a fairly good chance of developing shin splints. The pre-season conditioning program should begin at least two months — three would be better — before the runner gets up on the ball of his foot for sprinting. If the pre-season conditioning is gradual, the track man is practically assured of avoiding all muscle strains of the soleus and the tibialis posterior which seem to be the muscles involved.

Numerous techniques have been suggested to alleviate the discomfort of shin splints. In view of the previous analysis of this problem, it is suggested that the most practical approach would be to assist the afflicted muscle with additional support. This support may be supplied by using the following procedure:

1. Anchor the end of a 4-inch strip of elastic adhesive to the bottom of the

Al Sawdy is a 1930 graduate of Eastern Michigan College and served as assistant coach and trainer at Fostoria, Ohio, High School for 11 years. During the 1941 and 1942 seasons he was trainer for the Detroit Lions and the next year went to Beloit College in a similar capacity. He has been at Bowling Green since 1944 and served as one of the trainers for the Olympic team at Melbourne and the Pan American team at Chicago.

Dr. David Matthews is a member of the teaching staff, director of the intramural program, and assistant swimming coach at Bowling Green State University.

foot with 2-inch regular adhesive tape (Illustration 1).

2. With the foot extended, stretch the elastic up the back of the leg and anchor it with 2-inch tape just above the bulge of the calf muscle (Illustration 2).

3. Place 2-inch regular tape in horizontal strips around the foot and up the leg to the beginning of the bulge of the calf muscle. The strips above the ankle should be placed diagonally in order to produce a lift to the lower calf muscle. The strips should meet just in front of the foot and leg. These horizontal strips secure the long elastic tape to the ankle and leg and also minimize the shake and jolt of the calf muscle during running (Illustration 3).

In less severe cases, this type of support permits the athlete to continue running with little or no discomfort. This taping technique has been used for some years at Bowling Green State University and has proved to be very satisfactory. By lessening the strain on the muscle through the use of this type of support and with the application of heat (infra-red, whirlpool, analgesic pack) administered daily, the condition may clear up with no loss of time to the athlete. In more severe cases or if the condition worsens, the only recourse is rest plus daily heat therapy.

Thighs

Torn or Pulled Muscles. Usually the muscles which are torn or pulled are those located at the rear of the thigh, specifically the hamstrings. The cause of tearing is generally an incomplete relaxation of these flexors during the extension of the leg, especially during sprinting. Tightness of the muscles may be due to slow nerve impulse conduction, sudden chilling of the leg or tetanic contraction brought about by fatigue.

The problem of torn muscles cannot be entirely eliminated, but if the coach and athlete will follow certain procedures, it can be made negligible and perhaps improbable.

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One of the most common causes of torn muscles is the careless or carefree warming-up before hard exercise. Coaches should insist upon a proper warm-up and they should instruct the runners what is necessary for a correct warm-up. The athlete who does not take precautions to remain warm while waiting for his turn or trial, or does not go through another warm-up if there is more than a half-hour between events, is exposing himself to the danger of torn or pulled muscles.

Correct diagnosis of the injury before treatment is started is extremely important. There is a difference between a muscle strain or tear and deep vein thrombosis. The symptoms of the torn muscle are immediately evident, while the ruptured vein may not cause real trouble for one or two days after.

Augustus Thorndike says, *In the first stage of hemorrhage and hematoma formation, measures must be instituted to control hemorrhage and minimize the size of the hematoma.* Hemorrhage may be controlled to some extent by packing the area in ice or using other cold applications. The use of compression through bandaging or taping along with the cooling of the injured muscles will reduce the swelling caused by the interstitial bleeding.

An athlete should not do any running until the muscle has responded to treatment and is almost entirely healed. Treatment of the tear with heat is advised when all signs of hemorrhage have disappeared and proper absorption of the blood has been accomplished. The use of the short wave diathermy machine is advocated for the most rapid healing.

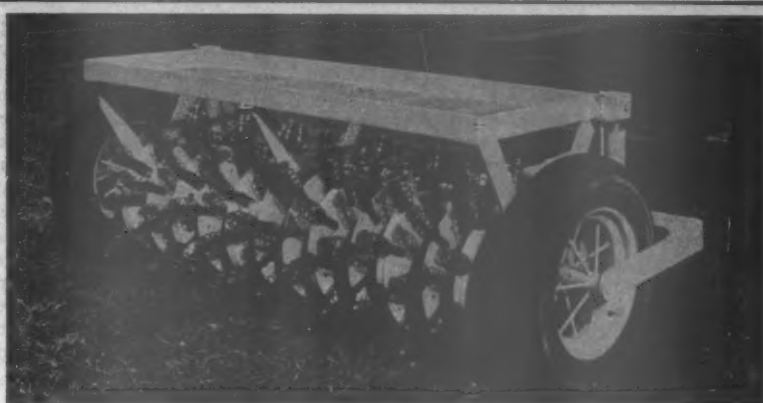
Since recurrence of injury often takes place if undue strain is put on the partially healed muscle, it is usually not wise to allow the runner to do any hard running. Easy jogging, continued diathermy treatment, and very light massage will help the healing process.

Baseball Bat

(Continued from page 40)

the slow junk ball pitcher. In drag and sacrifice bunt situations, the heavier bat is more desirable. From all indications the trend in organized baseball is for the athletes to use the lighter bat. Many will start the season with a heavier bat but will go to the lighter bat as the season develops. Ted Williams said, *I personally use a 34 ounce bat. If I were unable to get a 34 ounce bat, I would rather use a bat three ounces lighter than have to use one that is one ounce too heavy.*

In selecting bats, length is an important factor. Notice that the rules limit the bat length to a maximum of 42 inches, while weight is unlimited.



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Aerification Is Basic to Turfgrass Maintenance

The maximum length is seldom, if ever used. Generally, 36 inches is the maximum length. No doubt, a few exceptions can be found. Length is important from at least two aspects. The longer bat permits the batter to stand away from the plate and still provides adequate coverage of the strike zone. The longer bat provides more speed in the effective hitting, the barrel end of the bat. The speed of the barrel is vitally important. Obviously, in order to have the ball change direction and travel with maximum speed, momentum of the bat must be reduced to zero. The less time that is necessary

to reduce the momentum of the bat to zero, the greater must be the change in the momentum of the ball since the total momentum of the system is constant. The greater the impulse of the bat, the more effective is the speed of the ball which results. The rebounding speed of the ball, assuming conditions of elasticity, wind, point of contact on the bat, etc., is determined by the length of time the ball and bat remain in contact. The longer the time it takes to change the momentum of the ball, the slower will be the rebound. Theoretically, if the momenta of the ball and bat were equal, for

perfect elasticity, both would rebound with their original velocity but in opposite directions. Thus bat speed is important. It should be remembered that the greater the length of the bat, the greater the axis of rotation and the more difficult it is to control the hitting end of the bat. If both length and less mass are desired, the bat, by necessity, must be turned from the less dense billet. More breakage may be encountered in the lighter wood.

Shape can very well have a bearing on the effective hitting area of the bat. The location of the center of gravity and the center of percussion are important. The more uniform the shape of the bat from handle to barrel, the shorter is the effective hitting length. A billet of uniform shape has its center of gravity at the geometrical center. Hitting with such a bat would mean that the *live* hitting point of the bat would be very close to the center. The center of percussion has a definite relationship to the axis of rotation of the bat. The bat with the very fine handle and tapered toward the barrel to the maximum (2 3/4 inches) diameter has its center of gravity much closer toward the fast hitting end of the bat. Thus it is apparent that shape may have a significant relationship to hitting effectiveness. (See diagram at the beginning of article.)


Since amateur players are not in a position to have bats tailored to their needs greater care should be taken in bat selection. Physical attributes of the individual and the type of pitching to be faced are important considerations. Bat length, weight, and shape are equally important. These factors are more meaningful than merely selecting bats according to feel.

There are situations in a ball game where both light and heavy bats can be used to advantage. The decision to use a heavy bat throughout the game may penalize the hitter and give the opposing pitcher an advantage. If circumstances prevail where budget or other conditions do not permit a wide assortment of bats—lengths, weights and shapes—it would be much better to settle for light (30 to 34 ounce) bats of the very best grade. From such an assortment all players on the squad could possibly find bats best suited to their individual needs. This is important for a good offense. In the final analysis, ball games are won from base hits and runs. The bat wins the baseball game. Furthermore, the decision of which bat to select, or recommend, is a responsibility of the coach. For this reason, he should be thoroughly familiar with the factors that are involved in each bat selection or use during a game.


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Long Horse Vaulting

(Continued from page 14)

At this point his arms should push.

6. The performer's arms should stay up for balance and his gaze should be forward and downward.

Teaching Methods: 1. Learn the front handspring on the floor.

2. Learn the front handspring from the horse, using a spring assist take-off.

3. Practice the handspring from the horse to the floor.

4. Lower the horse and perform the handspring with spotters.

5. Finally, execute the stunt at competitive height with spotters.

Baseball Chart

(Continued from page 28)

We try to diagram as accurately as possible where the batter hit the pitch and how it was hit. At the lower left-hand corner of this box is the location of home plate. A straight line from this position would indicate a line drive, a curved line would indicate a fly ball, and a broken line would indicate a ground ball. An out or hit would be recorded in regular scoring fashion. As shown in the diagram, the batter has hit a double down the third baseline.

Diagram 1 shows the work of our pitcher against the opposing hitters. The first batter, Blanky, was a right-handed batter. The first pitch to him was a high fast ball swung at and missed. The pitch is recorded in the ball box as the batter swung at a bad pitch. The second pitch was a low outside corner fast ball called a strike. The third pitch was a high inside fast ball for a ball. The fourth pitch was a low outside corner curve swung at and hit foul down the first baseline. The last pitch was a fast ball down the middle at which the batter swung and flew out to right field.

At the top of our chart is the name of the team that is batting and the opposing pitcher. Thus the batting chart gives the name of our team and the opposition's pitcher, while the pitching chart contains the name of the opposing team and our pitcher. At the bottom of the chart is the key to the symbols used in the chart and a summary of all pitches thrown. The summary has the total of strikes and balls, and a breakdown showing how many strikes and balls of each type of pitch were thrown.

One of the advantages of the all-purpose chart mentioned previously is that it may be used to indicate the faults of our pitchers and batters. By studying

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this chart we can determine whether or not our pitchers are getting behind the hitters, if they are having trouble controlling a particular pitch, if they are mixing their pitches, which pitch is being hit the most, and which pitch is getting the opposition out. The chart is also an excellent aid for our hitters. It can show them which pitch is giving them the most trouble, whether or not they are meeting the ball in front, if they are hitting the ball where it is pitched, and whether or not they are swinging at bad pitches. By checking the pitching and batting charts after each game, we have a better idea of what faults need correcting, and are able to plan our practices more efficiently on an individual basis where remedial help is indicated.

Since our pitching chart is also a batting chart of the opposition and our batting chart is their pitching chart, we have a complete scouting report, pitch by pitch, of the pitching and batting of the opposition. By checking the opposition's batting chart of the last time we met, our pitcher is able to plan his pitching strategy more effectively when he faces this team again. Should we face the same opposing pitcher again, oftentimes we can determine his pitching strategy by checking the batting chart of the previous game.

Report on High School Track

(Continued from page 48)

year's sixth place performance would have scored in the meet of five years ago (1). Another way to point out the improvement is to record the number of performances in this year's meet equal to or better than the winning performance of five years ago (2).

Event	(1) Today's 6th place finish would have	(2) No. of today's performances better than winner 5 years ago
120 H.H.	tied for 1st	6
100	tied for 2nd	0
Mile	2nd	4
880 Ry.	2nd	1
440-Yd.	tied for 1st	6
180 L.H.	3rd	2
880-Yd.	2nd	0
220-Yd.	tied for 3rd	1
Mile Ry.	—	—
Pole	tied for 2nd	5
Shot	2nd	2
H. J.	4th	4
Discus	3rd	0
B. J.	3rd	0

Thus it will be seen that in the 13

events considered, 31 performances this year were better or equal to those of the winners five years ago.

National Honor Roll

Each year in connection with this report we present the National Honor Roll. Bill Russell of the California Interscholastic Federation selects the annual Honor Roll for the *National Federation High School Track and Field Guide*. Our thanks to both Bill Russell and Cliff Fagan, executive secretary of the National Federation, for making this material available to us.

This year's Honor Roll carries 179 listings. As in the previous years, California leads with 58 which is one of the lowest totals for that state in a number of years. By way of comparison, a year ago California had 70 listings and holds the all-time high of 73 on the 1954 Honor Roll. Texas increased its previous high of 37 listings a year ago by eight and thus reduced California's margin to 13, the closest any state has ever come to threatening California's supremacy in this regard.

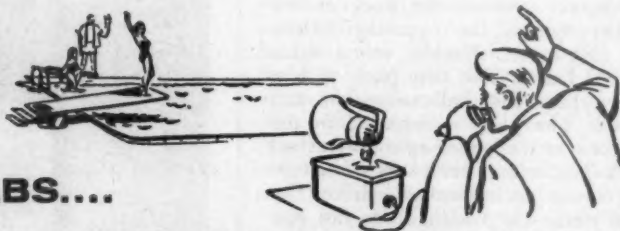
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The four leading track sections continue to dominate the Honor Roll. Of the 179 listings 84 per cent are to be found among the states comprising the Middle Atlantic, East North Central, West South Central, and Pacific sections. This figure remains fairly constant through the years, there being 87 per cent for the 1955 Honor Roll, 86 per cent for 1956, 85 per cent two years ago, and 80 per cent last year. We might point out that 57 per cent of the listings represent athletes and relay teams of California and Texas.

The state meets served as the major source of outstanding performances with 41 per cent established in the finals and another 30 per cent in district, regional, sectional or state preliminaries. What a day the broad jump judges must have had at the California Southern Section Meet. In the preliminaries, Howard jumped 24-2½, and in the finals Tripp went 24-9, Andrews 24-2½, and Tucker 24-0¼.

NEW BOOKS

Winning Basketball Strategy, by Glenn Wilkes. Published by Prentice-Hall, Inc., Englewood Cliffs, N. J. Two hundred and three pages. Publication date Nov. 24. Received for review Nov. 24. Price \$4.95.

Glenn Wilkes, the astute basketball coach at Stetson University, has compiled a .748 winning percentage at both the high school and college levels. In this book he does not devote space to fundamentals, but instead stresses the little items of strategy that will win games. Items included are: Before-Each-Game Strategy; Routine Game Strategy; Substitutions, Time-Out, and Half-Time Strategy; Strategic Defensive Situations; Zone Defense Attack Strategy; Strategic Defensive Situations; Special Last-Minute Strategy; Strategy by Charting; and Scouting Strategy make this a basketball text that is different and needed.

The Third Curriculum, by Robert W. Frederick. Published by Appleton-Century-Crofts, 35 W. 32nd St., New York 1, N. Y. Four hundred and fifty-four pages. Publication date Nov. 12. Received for review Nov. 16. Price \$5.75.

The book deals with extracurricular activities, their legality, financing, and administration. Sports, both interscholastic and intramural, do not of necessity receive the attention that they would in a book devoted only to that phase of the school program. However, in painting the overall picture of extracurricular activities, this book does an admirable job.

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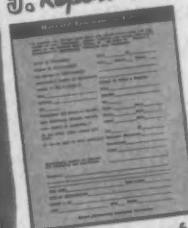
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Swimming Start

(Continued from page 18)

the race. Instructing a swimmer to use any but a relaxed position may defeat the very purpose of the training program. It would be well for the coach to experiment by having one of his swimmers assume one of the positions shown in Illustrations 1, 2, 3, and 4. Then the coach should run his hand along the vicinity of the swimmer's legs, arms, neck, and shoulders while feeling the tension in and around these areas. Now have the swimmer assume the position which is shown in Illustration 5. His arms and head are entirely relaxed, while his legs are not in a cramped position.

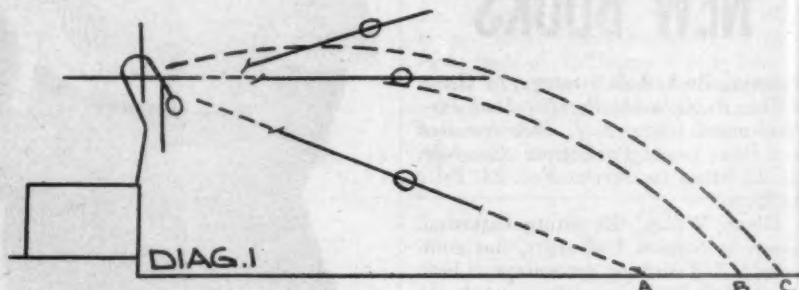
In addition to the advantage of relaxation, we believe this position has the following advantages:

A swimmer's legs are directly under

water if it follows an arch. If the body follows an angle toward the water, it will be in the water sooner. If it is hurled straight out, the other two paths of flight are used.

The straight line flight is favored because we feel it is the easiest one in which to position the body for proper entry into the water. Having the body follow an arch requires extensive control. During take-off the lower part of the body is lower than the upper extremities. Thus during the interval the swimmer is in flight his entire body must be leveled before or at the point of contact with the water. This movement requires precision body mechanics. When the body follows a direct angle toward the water, similar body control is required or it goes too deep. Little, if any, control is required when the swimmer pushes himself straight off the starting block following a parabolic path.

When we consider that the density of water is 1.0 per cubic centimeter,



his body. All the force goes into pushing his body toward the proper direction.

When the swimmer's head is down and relaxed, a certain amount of snap may be obtained by bringing it up abruptly at take-off. This movement aids the force of the legs.

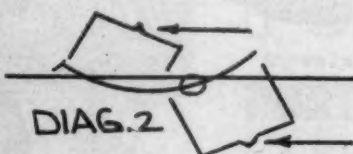
The swimmer's arms are in position for a short quick snap in and forward which may be as good or better than a long throw from behind.

Basically, the body can be hurled into three different paths of flight. As shown in Diagram 1, they are an arch (C), a straight line (B) or an angle toward the water (A).

We know from the study of physics that a body moving from its point of rest will go farther if it follows an inclined path up to a certain angle. Thus the body will go farther out over the

the position of entry is very important. A problem of friction reduction now exists. Many coaches will agree that the ideal position for a swimmer's body to be in upon entry is stretched out. His legs and arms should be in a straight line with his head and shoulders. Any other position results in unwanted drag. Some of the more common positions which result in resistance are shown in Diagrams 2 and 3. The arrows point to the areas where resistance is present both at entry and preceding the stroke. The arched position shown in Diagram 2 is frequently caused by throwing the arms forward too soon instead of coordinating them with the push of the legs. A similar entry results through trying to get too much height and distance.

The jacked position which is shown in Diagram 3 often results when the



Fred Heffner graduated from Bowling Green State University and has spent all four of his coaching years at San Marino where his record is outstanding. A previous article, "Training for Swimmers," appeared in the February 1958 issue.

swimmer's body is inclined at too great an angle during the body's flight. Here the tendency is to bend at the waist in order to have the head and feet land simultaneously. Many times a swimmer who is rather reluctant about landing in a stretched position will unconsciously bend in order to displace the shock from the water.

Now we will review the points which have been stressed in this article and recommend a technique for execution.

In order to enable the stationary body to become a moving body with a high degree of velocity, keep the swimmer's legs conditioned so they may provide the needed force.

A stationary body will be able to react faster with less chance of tying up if it is not in a cramped position. Head down and relaxed, arms hanging loose, and legs slightly bent should greatly enhance a quick reaction.

A straight flight path outward from the starting block should position the body properly for entrance into the water. It is also the easiest to control.

The swimmer's body should enter the water in a flat stretched out position. Any other position increases friction and unnecessary drag.

Baseball Indoors

(Continued from page 30)

ducted in the gymnasium. Our usual procedure is to have the boys form groups of six, and then each group runs four lengths of the floor at top speed without stopping. This method allows the group that has just finished to rest while the others are running. When each group has had three turns, the drill is ended. Every other day the boys do a few body-building exercises after their running.

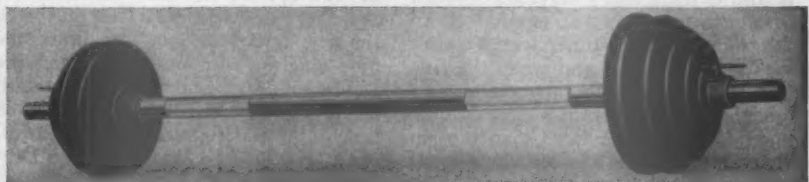
Our manager is instructed to turn the showers on when the boys start to run. We insist that every boy shower immediately after practice, and check to see that he does. The showers are hot and the boys are encouraged to rub and knead each others arms while standing under the hot showers.

It is our feeling that something constructive is accomplished indoors. By following this program, and adding other features that come to mind, the players are being prepared for the time when we can move outdoors, where the game of baseball belongs.

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THE EXPERIENCE OF 36 YEARS

This book includes the experience of 36 years of weight training for athletes by Bob Hoffman, the American Olympic coach in weight lifting. He coached winning teams at London, Helsinki, and Melbourne. He has been closely identified with many sports as a contestant, coach, and official for a full half century. This book was 2½ years in preparation, but you will agree when you study it, that it was worth the effort, for it is a very valuable book. It has been said, "Where would the American Olympic Team have been without Bob Hoffman's boys, grown up?" Sixteen of these kids started to read "Strength and Health" magazine, before and as they entered their teens, with its stories of weight training for athletes, and then started to train with weights, and won Olympic championships at Melbourne. Bob Hoffman has been editor-in-chief and publisher of "Strength and Health," for 26 years. They got good results from following the Bob Hoffman training methods and using Hoffman's Hi-Protein and Energol, Germ Oil Concentrate. For 36 years, Bob Hoffman has been showing athletes the way to better athletic performance, the weight training and weight lifting way. Any man can improve at his favorite sport through weight training, as shown by this latest of the Hoffman books.

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From Here and There

(Continued from page 4)

College, then Trinity (Texas) University, then McNeese State College (La.) and, finally, Georgia . . . There are several changes for the coming basketball season. Bruce Fossum goes from Green Bay (Wisc.) High School to assistant coach at Michigan State; Moe Radovich from Wayne State (Nebr.) to assistant at Wyoming; and Tay Baker from Wyoming, Ohio, High School to freshman coach at Cincinnati. Baker will also be varsity track and cross-country coach . . . In 1950 the NCAA added skiing to its list of championships and since that time Denver has never finished lower than second, winning six of the meets . . . According to a study conducted at the Missouri indoor track championships for classes A, B, and C there was a variance between .7 of a second and 2.5 seconds from the time the first runner was set after the "set" command and when the first man left his mark for any reason. Although this wide variance existed, two-thirds of the starts were made in an interval of 1.3 to 1.8 seconds. Of the total 125 good starts 75 per cent were

made within this time interval, while 68 per cent of the 85 false starts and 61 per cent of the 13 rolling starts occurred within the same interval.

★ ★ ★

IN 1926 the National Federation started to record national high school records. In the intervening 33 years, the 220-yard dash withstood the record onslaught better than any other event. In 1914, W. J. Carter, Jr. of University High School, Chicago, Illinois established the time of 21.4. Since then only Jesse Owens (1933) and Eddie Southern (1955) have seen their names go on the record books for that event, both having done 20.7. On the other hand, in the 120 high hurdles the record has been broken or tied 12 times. Next in line is the pole vault (outdoor) ten times, the mile and the shot put nine times, the 880 relay, discus, and the 100-yard dash seven times. In the latter event, the 1926 time of 9.8 was equaled by Tolan, Metcalfe (twice), and Wykoff before Draper moved it down to 9.6. In 1933

Owens did 9.4 and that held alone on the books until 1954 when Jackson tied it. The high jump record has been broken or tied six times, the javelin five times, and the 880, broad jump, and 180 low hurdles three times each, the latter event first going on the books in 1950. The other great record made by Jesse Owens — his 24'-11 1/4" broad jump held until 1954 when Upshaw did 25'-4 1/4" . . . The years of 1934 and 1951 were the only ones in which no new records were broken or tied . . . Realizing that with each succeeding year it becomes more and more difficult to break a record, nevertheless, the decade just closed far surpassed either of the two previous ten-year periods in the matter of new names on the record books. The 1930's saw 39 new additions to the record book, 16 in the 40's and an amazing 48 new marks for the 50's.

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3/17	7
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3/25	4
3/26	4
3/27	4
3/28	4
3/29	4
3/30	4
3/31	4

Mile Mechanics

(Continued from page 11)

ber 69s; January 67s; February 65s; March 63s; April 62s; May 61s; and June 60s.

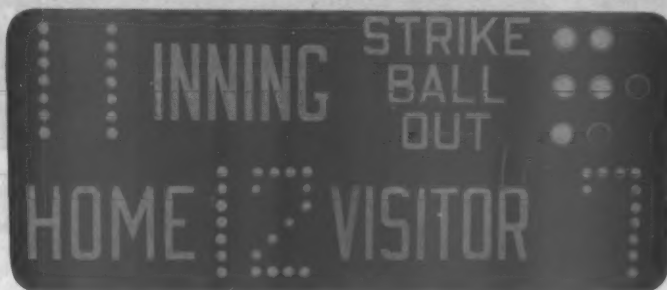
The training guide will be made up each month so the runner will practice interval pace work at the objective pace with a test or competitive effort every ten days to two weeks. The mile in mid-October is run in five minutes. Should the runner fail to achieve his five-minute mile, he would go into the next training period at the old pace effort.

What distances and what rest interval do we use? Each monthly training period is started with distances of 660, 440, 220 or 110 yards with rest intervals the same distance as the distance run. The second week the rest interval is cut to one-half the running distance. The third and fourth weeks the rest interval is one-quarter the distance run.

Runner's Schedule

1. Warm-up, arm and shoulder work. Rope rings or apparatus.	A. 20 sec.
2. Fartlek.	B. 15 sec.
3. Light Fartlek.	C. 16 sec.
4. Repeats 110 yds.	D. 14 sec.
	5. Repeats 220 yds.
	A. 25 sec.
	B. 25 sec.
	C. 25 sec.
	D. 31 sec.
	E. 29 sec.
	6. Repeats 330 yds.
	A. 54 sec.
	B. 51 sec.
	C. 45 sec.
	D. 45 sec.
	7. Repeats 440 yds.
	A. 75 sec.
	B. 72 sec.
	C. 70 sec.
	D. 68 sec.
	E. 66 sec.
	8. Selected longer distance repeats.
	9. Sets of 660 440 220
	A. 1:50 70 34
	B. 1:45 68 32
	C. 1:42 66 30
	D. 1:39 64 29
	E. 1:36 62 28
	10. Bunches 2 or 3
	660's; 3 to 6 440's;
	6 to 10 220's. Use
	same time as (9A,
	B, and C).
	11. Run out or cool
	down after each
	competition or
	workout.
	12. Wind sprints.
	13. Alternate sprint 55
	yds. shag 55 yds.
	14. Up and down hill.
	Explanation:
	Reading across the
	page shows the order
	of activity for
	each date. When a
	small number ap-
	pears at the top,
	it indicates the
	number of times
	the activity was
	repeated. The sec-
	ond activity for
	Sept. 26 shows
	that five repeat
	220's were run in
	35 seconds. The
	number, 17, would
	indicate that
	bunches of 440's
	were run. This is
	the actual work
	schedule of Dyrrol
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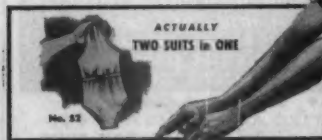
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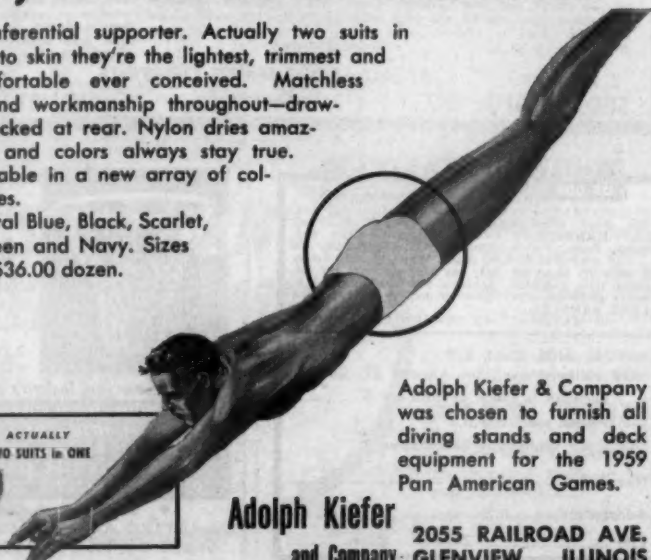
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The accompanying chart shows the schedule for our runners.

Baseball Diamond

(Continued from page 16)

coaches believe. The Cleveland Indians hold their spring training in one of the finest parks in the country which is located in our city. This field is maintained by one man the year around, with the help of Cleveland's head grounds keeper for only two weeks late in January. The skinned or dirt areas in this park are prepared according to the methods presented in this article. This preparation takes only a few weeks but need not take that long for a high school or college field that does not require the meticulous preparation necessary for a professional park.

Every ball field, regardless of the nature of the soil, should have a fresh layer of dirt mixed with sand on the top. This loose layer should be one-half to three-quarters of an inch thick. In order to maintain this layer properly, the field should be disked or plowed up at least once every three years. Deep renovation is another name for this process, and it should be done mainly to the base paths and skinned areas to about three inches in depth. This process will turn over the soil and mix it thoroughly.

The next step is to drag this turned-over soil thoroughly with a nail drag made of three or four rows of 2 x 4s or 2 x 6s, three feet long. Cross pieces can be nailed on top to hold them together. Then 20 to 30 sixteen penny nails should be driven into each board and spaced so they will cover the underside of the drag thoroughly. This dragging should be done on foot, but will not take too long. Pulling the drag with a vehicle tamps down dirt before it is ready to be packed. Nail dragging not only levels the field, but brings many rocks to the top. These rocks can be easily disposed of later.

After the field has been leveled thoroughly, a very important procedure follows. In order to keep rain or any other water from standing on the field, the dirt must be packed as solidly as possible. This packing closes the pores in the soil and allows for a run-off of water. A second major function of packing is to provide a hard foundation so

Lee Carey spent seven years in organized baseball, playing on several Cleveland farm teams. In 1952 he became assistant coach at Tucson High School under his former high school coach, Hanly Slagle. Two years later he was made head coach, and in the next four years his teams were state champions twice and runners-up the other two years. He moved to Rincon High School a year ago and is head of the physical education department as well as baseball coach.

that spike or cleat marks will not dig up pits or holes which give a baseball bad bounces. It is extremely important to have as hard a foundation as possible. Most of the trouble with poor infields comes from spikes digging up large clods of dirt from a poorly packed foundation. This packing is done best with an ordinary smooth tire tractor, preferably one with four tires on the back and two on the front. However, before this tire rolling takes place, the field will have to be soaked thoroughly and then dried to find any low spots and to prevent the dirt from oozing or sticking to the tires of the tractor. Even after the rolling is finished, there will be a few spots where the tires went down too deep and did not pack the soil. These spots must be nailed again, dried, filled in, and packed again. This second nailing will keep the soil in place and almost completely level the skinned areas.

Now the field should be fairly level, with a well-packed dirt area, but there will still be tire tracks and ridges to be smoothed over. In order to get rid of these tracks and ridges and to show up any uneven area on the dirt, nail the entire area again just enough to scrape loose dirt from the top of the packed infield. Now any uneven areas or dimpled spots can be seen. Next, by using a float this small amount of loose dirt can be pulled to any place desired. Dragging this dirt will fill in the uneven spots. The field must be packed again because of the loose dirt on top. Wet it thoroughly and repack the area when it dries sufficiently.

The infield area is level now and packed as solidly as concrete. Next a cushion should be placed on top to slow the ball down and provide protection for the players' legs and feet. This cushion should be made deeper around the bases for sliding purposes. It should not be more than one-half to three-quarters of an inch in depth, as mentioned previously. If the cushion is loose, bad hops and unsure footing will result. A thin layer of sand will produce the desired results, but it should be as fine as possible. Washed mortar sand works very well, and color is also important. Most sand is very light colored and will work, but is not recommended. The darker the sand and dirt, the better the

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background will be to see ground balls. Texture and consistency of dirt will vary in different parts of the country, but we have found that brown adobe dirt peculiar to our section works satisfactorily. A small amount of clay can be mixed in this dirt but not enough to make it gummy when wet. This clay-adobe dirt packs well. Too much clay in the skinned areas causes gumminess when they are wet and is likely to harden so that nail drags will not loosen the top and mix well with the sand. The amount of sand to be used will vary between eight to ten yards, approximately five for each side including the base paths. An extra amount of sand will be needed around the bases for sliding purposes.

After the thin layer of sand has been placed on the infield, the area will be about ready, but if it is left this way the first wind will take all the sand. Mix the sand with a small amount of dirt for cushioning and keeping the field properly proportioned. This cushioning can be accomplished by wetting the field thoroughly and letting it dry enough so that the nail drag will penetrate through the sand and mix with a thin layer of dirt without becoming muddy. The field will be damp but when it dries then it will be ready for play.

There is one other item before considering the pitcher's mound and the batter's box. We mentioned previously that the original dragging and disking will bring rocks to the top, and even after the field is packed, further dragging will leave many rocks on top with the sand. It is well if the dirt on all fields is screened so loose pebbles or rough places will not be present, but this screening is too expensive and time-consuming. There is an easier way to rid an infield of rocks. After the field has been packed and mixed with sand, if there are too many rocks, the loose top soil can be screened in a very short time. This is done by using a wooden rake-like float and pushing all loose soil, including rocks and sand, into rows or

piles and then screening it. After screening, the dirt should be thrown back minus the rocks. A screen that has one-fourth inch openings is acceptable. The finer the screen, the finer the dirt will be.

The field is now ready for play. An occasional wetting and dragging will keep it firm but not too hard, and spongy but not too soft. After each practice our fields are brushed and then wet. The next day the nail drag will loosen the top. This dragging should be done while the field is damp because only dampness will allow the hard undercrust to give a little. It is not necessary to use the drag every day, but a daily brushing keeps the top smooth.

The base paths are prepared the same way, but too much clay should not be used. Clay should be used only for the pitcher's mound and the batting area. Individual preference will dictate how wide the base paths shall be. Ours are six feet wide. This width saves the grass, adds to the appearance of the field, and gives runners more area and surer footing.

Construction and maintenance of the pitcher's mound are important. As far as the soil is concerned, the most suitable is a mixture of dirt containing a good portion of clay. Most areas of the country have good hard clay that will not give under strain. We find dark clay is the best. This soil is not screened because screening causes clay to lose its shape and form. Regular chunks will pack very well after they have been dampened. Solid clay may be used in the area immediately in front of the rubber to a length of approximately six to eight feet. Some coaches like their mounds high, some low. The infield grass area should slope gradually to the dirt of the mound so that the mound will not appear to be too high. Rule specifications say the mound should be up to 15 inches above home plate. After forming the hill, a light layer of sand will help keep it dry and prevent the

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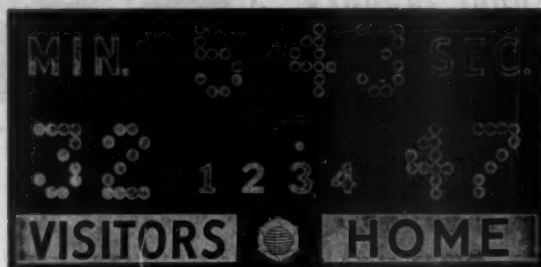


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mound from crusting and cracking due to the rays of the sun. The mistake many grounds keepers make in caring for the mound is filling holes made by the pitcher with the loose top sand. After each practice the soil should be loosened and put back into its position, and, if possible, tamped down to harden for the next practice or game. The same procedure should be followed for the batting and catching area, except there should be more loose soil for sliding runners.

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(Continued from page 22)

hand shoulder on the high-hand pad.

The hip check (Illustration 4) is similar to a vertical side body block. The player throws in either hip, high or low-hand side, driving off his rear leg. Crisp contact with the hitting hip is encouraged.

After these techniques have been developed and can be run at top speed, they are combined with picking up the ball (Illustration 6), providing a

Illustration 4





Illustration 5

good man-ball drill. The ball is thrown from in front of the pan (left side of the illustration). A player from one line who is facing the pan calls *man*, and then slips in with a shoulder block or hip check. The player on the other line sweeps in to scoop up the ball. The lines can be designated either ball line or man line, or the man nearest the ball can be instructed to take the ball, and the other player should take the man.

The method of holding off a crowding attack man and getting him back



Illustration 6

on the end of the stick is shown in Illustrations 7 and 8. The low hand of the defensive player is placed on the pad. Then he jumps back, and in landing with his feet parallel, brings the stick up on the pad. This maneuver is followed with a jabbing motion through the high hand, similar to a pool cue. The entire movement is executed several times in succession by each player. Players should be instructed not to jab the stick into the

Illustration 7



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Illustration 8

pad too vigorously because the side of the stick is not supported and might break at the corner above the handle.

Then the players are taught the quick, work-up chop. A player changes

George Akerstrom played on Andy Kerr's teams at Colgate and then coached the line at Middlebury College until the war. Following service in the coast guard, Akerstrom went to Kimball Union Academy where he has coached football, hockey, and lacrosse, in addition to serving as athletic director.

to the work-up chop (Illustrations 9 and 10) from the pool cue, moving



Illustration 9

to his high-hand side, covering a 90° arc. Emphasis is placed on the shuffle movement of his feet, staying on balance, and working the stick up with short, deliberate chops.

Illustration 10



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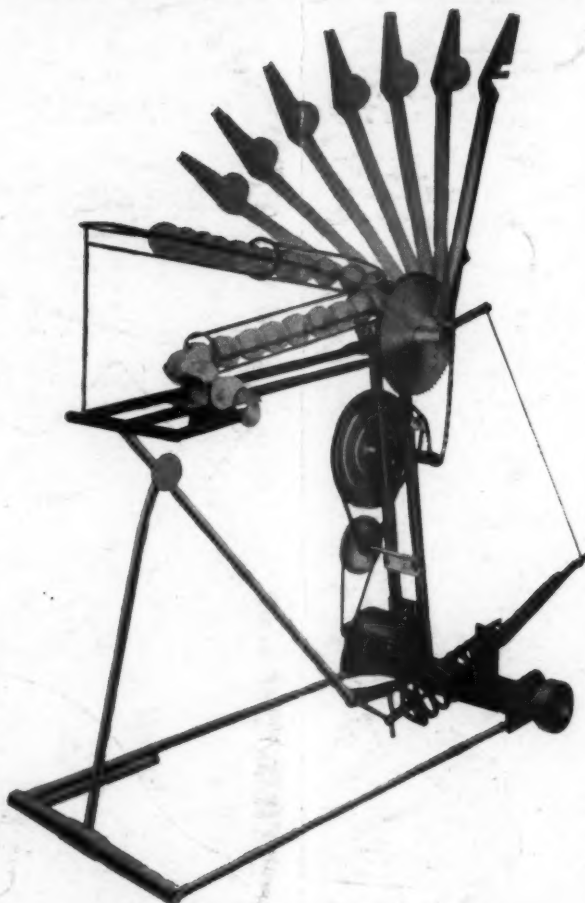
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